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OF WESTERN AUSTRALIA

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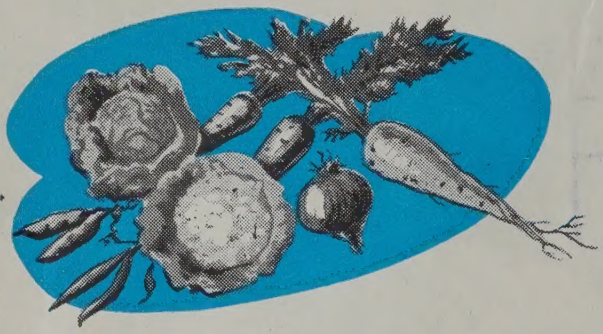

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COVER PICTURE

Apple-blossom time. An attractive camera study made in an orchard near Bridgetown

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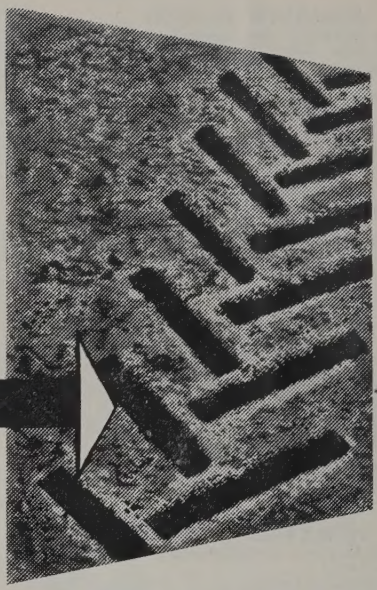

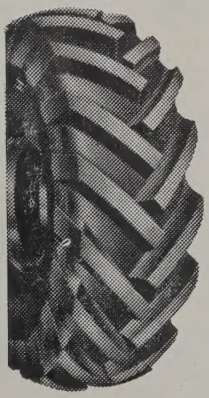

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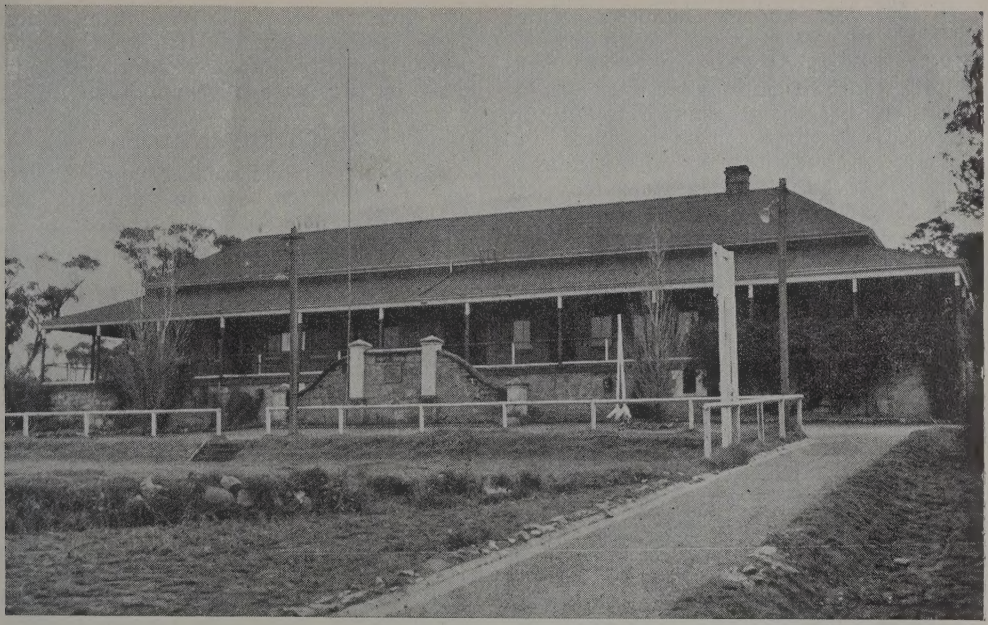

Fig. 1.—The Muresk homestead built by Andrew Dempster in 1899. It houses the College dining room, recreation room and administrative offices.

MURESK AGRICULTURAL COLLEGE

By W. SOUTHERN, B.Sc. (Agric.), Dip. Ed., Principal

WHEN the West Australian Government established Muresk Agricultural College in 1926, it added a new chapter to an interesting story of land settlement and utilisation which had its origin in the early years of the Swan River Colony. Much of the present College land was included in a 4,400-acre grant made to Henry Reveley in 1838, but portions of the grant were forfeited in the same year and taken up by Du Bois Agett, the property then being known as Down Farm.

To Down Farm in 1856 came Matthew Oliver with his bride. It was he who planted the large pepper tree which still stands in front of the West Dormitory. Old records indicate that wheat was grown on Down Farm a popular variety being Clubhead. Although no superphosphate was used, yields of from nine to twenty-six bushels to the acre were obtained over long periods.

Large quantities of sandalwood provided settlers with a means of augmenting their incomes. This fragrant wood was in keen demand in China, where it was used in the manufacture of joss-sticks, and many dray-loads were carted to Perth for export. The son of Matthew Oliver remembers journeying to Perth in a dray drawn by a horse and a bullock yoked in tandem.

For some years prior to 1890, Down Farm had been owned by Andrew Dempster, one of the sons of Captain James McLean Dempster, master of a schooner trading between Australia and Mauritius in the 1830's. Captain Dempster had become a farmer on the Bucklands Estate at Irishtown near Northam and his sons maintained the family's amphibious traditions by establishing a sheep station at Esperance and annually captaining the sailing ship which took their wool-clip to Adelaide and returned with stores.

In 1887, Mrs. Andrew Dempster became seriously ill at Esperance. With his sick wife, his eldest daughter and two blackfellows, Andrew Dempster set off in a buggy and, with only a small compass to aid him, travelled 600 miles across trackless and virtually unknown country to Northam in order to obtain medical advice. The trip took about three weeks and was accomplished in almost incessant rain. Such a magnificent piece of bushmanship deserved a happy ending but unfortunately Mrs. Dempster died after an operation had been performed.

Perhaps it was this bereavement which influenced Andrew Dempster to take up his abode at Down Farm which had been rented to a man named Smith. In 1899 he built the magnificent homestead which now contains the College dining-room, kitchen and administrative block, and in the following year he renamed the property Muresk after the Dempster's family estate on the River Esk in Scotland.

Andrew Dempster died in 1909 and the portion of the estate on which the homestead stands passed into the possession of his daughter, Mrs. E. W. Cotton, whose husband was sole administrator of the property. They lived at Muresk until its purchase by the State Government in 1925.

MANY ADVANTAGES

The College lands are 2,222 acres in area and are located between Northam and York, nine miles from the former and 15 miles from the latter township. Situated as it is on the verge of the wheatbelt, it has an assured rainfall and its location permits of practical instruction being given in cereal-growing, dairying, fruit-growing and the production of root and forage crops.

The property is located in excellent stock country and affords opportunities for students to receive instruction and practical experience in most branches of animal husbandry.

The College buildings are on rising ground commanding a noble view of the Avon Valley. The Avon River flows through the property, adding to its beauty and affording the students facilities for swimming.

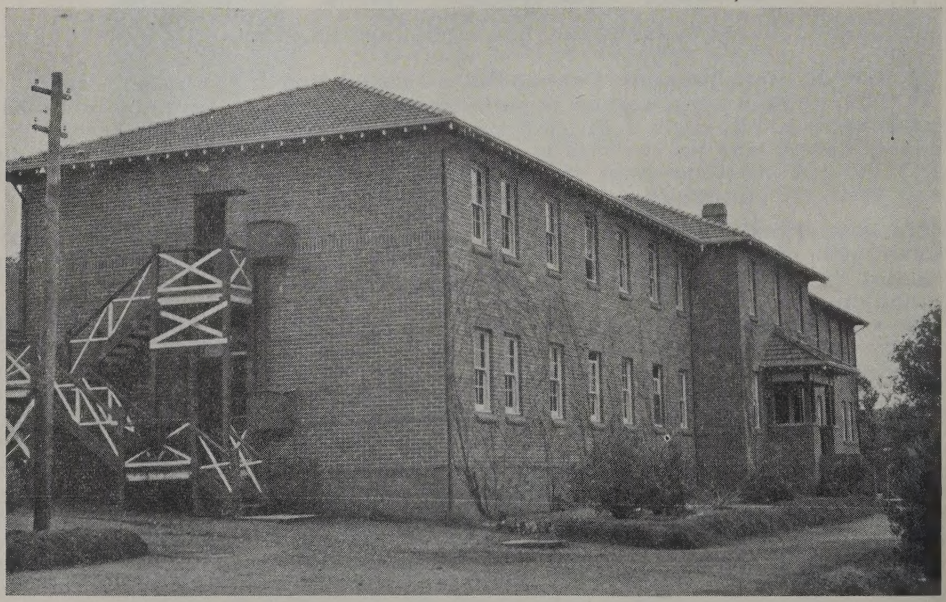

Fig. 2.—One of the two dormitory blocks.

Fig. 3.—The Muresk science block containing laboratories and lecture rooms.

The surrounding country is undulating and well-wooded and the average elevation of the property is 600ft. above sea level, an altitude which makes the location a particularly healthy site.

Being only 64 miles from Perth, the College is readily accessible by road or rail, which facilitates the close association between it and the Department of Agriculture.

Muresk is similar in standard to other Australian agricultural colleges, such as Dookie, Gatton, Hawkesbury, Longerenong, Roseworthy and Wagga, and has already made worthwhile contributions to tertiary education in our State.

Its aims are:—

1. To train students in the science of agriculture and farming practices, or in dairy factory work, and at the same time to provide opportunities for continuing with some aspects of general education.

2. To raise the general standard of efficiency in farming by holding short courses of instruction for farmers.

3. To carry out research work.

4. To raise the standard of stock in farming areas by breeding and distributing pure bred stock.

Wheat, oats, barley and peas are grown on the College lands and, in accordance with the rotation which obtains at the College, certain of the paddocks are laid down to pasture, principally subterranean clover and Wimmera ryegrass. To provide green feed in summer for the dairy herd, pigs and poultry, a plot has been laid down under irrigation.

For instructional purposes, the College has an orchard, vineyard, vegetable garden and apiary.

The Muresk dairy herd consists of pedigreed Guernsey cattle and is noted as being one of the finest herds of that breed in Australia. Pigs herds of improved Berkshire and Tamworth have been founded on foundation stock imported from Great Britain, New Zealand and elsewhere and these are two of the leading pig studs in the State.

The College sheep flock consists of Merino ewes run as a commercial flock. Border Leicester x Merino ewes are also

bred from these for mating with British breeds in connection with the raising of fat lambs for export and the local market.

In the poultry section the main breeds are the Australorp, White Leghorn and Rhode Island Red.

A complete building scheme has been laid down for the College and subsequent additions will conform generally to this plan. The present College buildings consist of two dormitories, a science block, lecture rooms, a domestic block, and residences for members of the staff. In the dormitories each student has a separate room and in the bathrooms hot and cold showers are installed.

A large common-room, a library and reading rooms and a dark room are set apart for the use of students. Radios have been installed.

The science block contains senior and junior laboratories and a lecture room. An up-to-date gas plant is now in use in the laboratories. A carpenter's shop and blacksmith's shop are provided in which technical instruction is given to the students. A modern butter and cheese factory fitted with the latest machinery and equipment is provided for students taking the dairy factory course.

The College has its own power house to provide light and power for the buildings, and for its water supply the establishment is connected to the Goldfields Water Scheme. The septic tank system has been adopted for the treatment of sewage.

NEW ARRANGEMENTS

Some changes in the two courses conducted at the College were introduced last year. Formerly, the Junior Certificate standard was sufficient to ensure consideration for admission to a three-year course. The first year of that course was, of necessity, largely a secondary school training in order to ensure that all students would be sufficiently grounded in essential subjects.

Many did not have the opportunity to study subjects such as chemistry before entering the College. Those who had already received an adequate educational background were admitted direct to the second year of the three-year course.

Under the new arrangements it is possible for all students to take the necessary preliminary course before entering Muresk, or in other words exemption from the first year of the old course now applies to all and the Diploma course is now of only two year's duration.

Applications for admission to Muresk should be made during the Junior Certificate year or earlier. The selection is made after the Junior Certificate results are available and the successful students proceed to their Sub-Leaving Certificate study at the school of their choice.

For example, students who are chosen after the 1954 Junior Certificate results are available, proceed to Sub-Leaving work in 1955 and, provided they perform a satisfactory year of study and are favourably reported upon in other respects during that year, they are eligible for admission to Muresk in 1956.

Some students may wish to complete the Leaving Certificate and enter the College in 1957. That arrangement is possible provided that the Principal is informed of the position. Others may not make application until their Sub-Leaving year but provided that they are taking the correct course of study and that there are vacancies available, their applications will be considered for the following year.

The Sub-Leaving studies should include English, Maths A, Geography, Physics, Chemistry, Biology (or Physiology and Hygiene) and a junior standard in Bookkeeping and Commercial Methods should be achieved if that subject was not included in the Junior Certificate year. Students who are unable to take the correct Sub-Leaving course at their Junior Certificate school may enrol at the Northam High School for that year. At this school a special class is conducted to meet the requirements of Muresk Agricultural College.

THE DIPLOMA IN AGRICULTURE COURSE (M.D.A.)

The M.D.A. Course.—It will be seen from the foregoing that the academic course at the College has not been changed, but the year of preparation for that course is taken elsewhere. To avoid a reduction in

the amount of practical work (students normally spent a proportion of each of the three years at the College on practical farm work) it has been laid down that first-year students must remain at the College during four weeks of the eight weeks' summer vacation and second-year students will be similarly occupied during two weeks of the four weeks' winter vacation.

Lectures and demonstrations are given to the students in the lecture room and laboratories. Records are kept by the students of all work performed and a farm diary course covers routine work on the farm.

Excursions are arranged to places of agricultural interest, and in addition to theoretical and laboratory work, students must cover the full range of practical work. They take part in all field operations on the farm and work in the smithy and carpenters' shops. Their training covers the handling of tractors, various implements and different types of machinery.

Each student is given practical instruction in building construction and blacksmithing and in turn they spend time in the dairy, piggery, poultry sheds, orchards, vineyard and garden. They also gain practical experience in the breeding and management of stock, and work in the sheep yards and woolshed. Students are engaged in class work and practical farm work on alternate weeks.

Applications.—Applications for admission must be completed and reach the College by December 31 of each year. These should include completed application form, medical certificate as to general fitness, two testimonials including one from the Headmaster of the applicant's school, the applicant's own statement as to interests, ambitions, etc., and, where desired, an application for inclusion in the scholarship selection.

Marks must be applied for when the applicant enters for the Junior Certificate examination.

Fees.—The fees charged are very low—in accordance with Government policy—and are approximately £80 per annum.

Fig. 4.—Members of one of the farmers' winter courses inspecting experimental plots.

Scholarships and Assistance.—Several scholarships for Muresk are available and awarded each year and the selection of applicants is made at the end of the year immediately prior to the year of entry to the College.

Education Department Scholarships and allowances may be continued at the College and the "living away from home" allowance of £40 per annum is available to students entitled to it.

The McCaughey Bequest and the Canteens Services Fund's assistance apply to Muresk College students who come within the provisions of the scheme.

General.—The College year is divided into two terms of 20 weeks each; the first term begins late in February and ends early in July and the second term commences in August and concludes at Christmas.

Students have the advantages of a residential college and facilities are provided for sports. General recreation committees are elected for the control of cricket, football, tennis, swimming, athletics, rifle shooting, gymnastics, etc. The annual sports meeting is held just prior to the Royal Show and a swimming carnival is held annually in the attractive college pool.

For indoor recreation there are two reading rooms, piano and radios, a billiard table, table tennis outfits and a technical and fiction library provides literature to meet the needs of the students.

Hobbies such as photography are encouraged and facilities are provided. The College has a cinematograph with a sound track and films are shown frequently.

The College conducts its own savings bank agency, book store, tuckshop and post office.

The majority of the students are farmers' sons who return to the family farms but there are many other avenues of employment open to Muresk graduates. Those with good academic qualifications may proceed to the University in order to study for the degree in agriculture.

The College is a sub-department of the Department of Agriculture and copies of the College prospectus may be secured from the Principal, Muresk Agricultural College, Muresk, W.A., or the Department of Agriculture, St. George's Terrace, Perth.

DAIRY SCIENCE COURSE

Due to several causes it has been found necessary to suspend the Diploma course in dairy science but, provided there are a sufficient number of students available, a shorter course in dairy science (butter and cheese factory procedure) will be conducted from late February until early July in each of two successive years for butter and cheese factory operatives with suitable educational backgrounds.

The cost of each of the two periods of the course is approximately £41 and includes board and residence, laundry, sport and medical charges.

Text books, etc., costing approximately £14, would be needed and certain equipment such as sheets and blankets must be provided by the students.

A deposit of £3 must be lodged, which is returnable at the end of the course provided all accounts have been met.

Scholarships valued at £15 per period are available in order to assist students.

Successful students will be awarded the Muresk Certificate of Competency in Dairy Manufacture subject to their obtaining (a) Milk and Cream Grade Certificate, (b) Milk and Cream Testing Certificate, and (c) Butter and/or Cheese Making Certificate.

If these are not held by the conclusion of the course the award of the Competency Certificate will be held over until the other certificates are gained.

The Muresk dairy factory contains accommodation in separate manufacturing rooms for butter and cheese making. It is equipped with dairy factory machinery of the latest design and with cold storage rooms for butter and cheese. A large well-equipped bacteriological laboratory is incorporated and the factory is supplied with milk and cream from the College dairy herd. Where necessary, supplies are also augmented by purchase from selected sources.

Further details of this course may be obtained from the Principal, Muresk Agricultural College, Muresk, W.A.

FARMERS' WINTER COURSES

During the winter vacation (four weeks in July-August) two short courses for farmers are conducted. The subjects of the courses vary from year to year and details are announced in the press and on the radio. The 1954 subjects included a three-day course on sheep and wool and a second course of similar duration covering "The Role of Pastures in Animal Production."

Students go into residence at the College for three or four days and the chosen topics are thoroughly discussed and illustrated by demonstrations, the showing of suitable films and slides together with lectures and practical demonstrations.

Intending applicants are advised to apply early as accommodation at the College is limited and each year many applicants have to be refused admission on this account. A nominal fee is charged.

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NEW CEREAL VARIETIES IN AUSTRALIA

By I. THOMAS, Registrar of Cereal Varieties in Australia and
J. REEVES, Agricultural Adviser

DURING 1953, one wheat, one oat and one flax variety were submitted and accepted for registration. In addition one oat variety, accepted for registration in 1951, is described in this Journal for the first time.

Particulars of these varieties as supplied to the Registrar are as follows:—

SHERPA: The wheat cross Ghurka x Amity was made by A. R. Raw at Dookie Agricultural College, Victoria; subsequent selection also took place at the College.

The head is white, square, erect, partly bearded and non-shattering. The grain is white, round and starchy. The baking quality is described as being slightly superior to that of the principal wheat varieties grown in Victoria. It is four days later maturing than Insignia, the period of maturity being early to mid-season. The straw is short to medium in height, strong and stands well. Susceptible to rust, but resistant to flag smut.

BOVAH: An oat variety obtained from the crosses Bond x Victoria x Hajira, made by R. E. Soutter of the Queensland Department of Agriculture and Stock; subsequent selection was carried out at the Regional Experiment Station, Hermitage.

The panicle is equilateral and erect with strong branches. The straw-coloured grain, medium in length, is of poor quality and has a fine awn. The straw is coarse, yellow and stout and of medium height; maturity is mid-season and it flowers 11 days earlier than Algerian. It is resistant to crown rust and Helminthosporium blight under field conditions, but is susceptible to stem rust. It is liable to shatter, however, it is intended solely as a grazing variety. Its recommendation for this purpose is its possession of crown rust resistance unassociated with susceptibility to Victoria blight. In addition it has been tested and proved suitable under field grazing conditions.

ACACIA: Although accepted for registration in 1951, this oat variety has not yet been described in this Journal.

The crosses (Victoria x Richland) x Algerian x Fulghum were made by S. L. Macindoe, at the New England Experiment Station, Glen Innes, New South Wales; subsequent selection also was carried out at that station.

The panicle is equilateral and erect with weak branches. The brown coloured grain, medium in length, is plump and has a fine awn. The straw is fine, yellow, stout and is medium to short in height; maturity is late, being six days later than Algerian. It is highly resistant to smut, but is moderately susceptible to leaf rust and susceptible to stem rust, race 8.

It is suitable for grain and for grazing, in these characteristics it is reported as being superior to Algerian.

VENTNOR: This flax variety was obtained from the crosses [(Saginaw x Ottawa) C.I.687 x Norfolk Earl][1] x Norfolk Earl; made by A. T. Pugsley at the Waite Agricultural Research Institute, South Australia; subsequent selection taking place at the same locality.

It has small, violet flowers and small, partly dehiscent, easy threshing capsules. The seed is small and brown and the maturity is the same as Liral Crown. It is resistant to South Australian races of flax rust *(Melampsori lini)* and is equal to, if not superior to, Liral Crown in both fibre yield and grade.

Fig. 1.—Position of knife when sticking. The point enters just behind the base of the jawbone and the edge of the knife is facing towards the front of the neck.

FARM BUTCHERING

SLAUGHTERING, SKINNING AND DRESSING A SHEEP

By H. P. DWYER, Sheep Husbandry Instructor, Muresk Agricultural College

THE slaughtering and dressing of sheep for the domestic meat supply is a constantly recurring farm chore. Never a pleasant task, it is often made unduly arduous by lack of skill on the part of the operator. It is hoped that this picture-story will point the way to a quicker, cleaner performance, with the attendant benefits of better meat and higher skin prices.

Very little equipment is needed, other than a sharp knife, a gambrel and a hoist of some kind. A slaughtering cradle is an advantage, but not a necessity.

The knife should be a sharp-pointed "sticking knife" and it should be honed to a razor-edge and kept really sharp. Butchers soon develop the habit of giving their knives a few quick touches on the steel after each few cutting strokes, and the farmer could well follow their example. If you have not learnt the knack of handling the steel, at least spend a little time with an emery wheel and oilstone to ensure that your knife is kept keen-edged.

A curved skinning knife, in addition to the sticking knife, is worth having, but as the knife should be used as little as possible when skinning a sheep, most farmers will find the sticking knife adequate for their needs.

Fig. 2.—The clenched right fist is placed on the nape of the neck and a strong upward pull with the left hand breaks the neck.

SLAUGHTERING

Sheep for slaughter should be yarded early and given ample time to rest and cool off before killing. This results in better meat with improved keeping qualities.

The sheep is laid on its left side in the cradle. The operator stands behind it so that he can draw back the head, holding the lower jaw with his left hand. (Fig. 1.)

Before picking up the knife, the beginner should feel with the fingers of the right hand to locate the space between two of the neck vertebrae just above the base of the jawbone.

Once the position is known, it is a simple matter to locate it in future by a light pressure with the back of the knife. Having found the spot the knife is tipped forward so that it is vertical with the point downward and the sharp edge facing away from the operator and towards the sheep's throat.

Sticking is done with a quick downward pressure so that the knife passes through the neck. Cut forward about an inch to ensure that the main blood vessels are

Fig. 3.—Opening up the first foreleg.

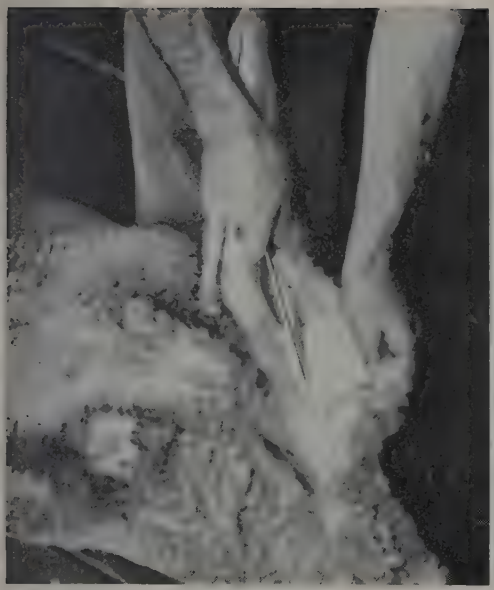


Fig. 4.—Open up sufficient skin to "fist" off the skin down around the point of the shoulder. Repeat on other foreleg.

Fig. 5.—Cutting the foreleg joint.

Fig. 6.—Skinning the brisket.

Fig. 7.—After skinning the forelegs and brisket, the skin is "fisted" off the belly to a depth of a foot or more.

severed, then turn the knife and cut back to the spinal column in the space between the vertebrae.

Lay down the knife and place the clenched fist on the nape of sheep's neck. Press down strongly, at the same time pulling the head up smartly with the left hand, to break the neck and ensure a quick and painless death. (Fig. 2.) A touch of the knife at this stage will sever the exposed spinal cord.

Breaking the neck is compulsory in slaughtering sheep—the animal must not be allowed to bleed to death.

Many farmers cut right through to the front of the neck after sticking, but this is not necessary and tends to cause a large area of the neck wool to become blood-stained.

SKINNING

Forelegs.—Lay the animal on the floor on its left side and stand facing towards the head with the feet close to the sheep's

Fig. 8.—Opening up the hind leg.

Fig. 9.—"Fisting off" the skin of the hind leg.

Fig. 10.—The point of the knife indicates the position of the cut through the joint. Break with a sideways pressure.

Fig. 11—When both hind legs are skinned and skin freed from the vent, hold the tail in one hand and pull skin free from flanks.

back. Pick up the top foreleg and hold the foot between the knees so that both hands are free.

Open up the skin just below the knee (Fig. 3) and run the knife straight down to the point of the brisket and then along the centre of the throat to the point of the chin. Keep the point of the knife inclined slightly upward to avoid cutting into the flesh.

Use the knife as little as possible in freeing the leg—in fact at all stages of the skinning—and where it is used keep it well out on the skin about an inch from the flesh. Free the skin on the inside of the leg first, then insert the clenched fist

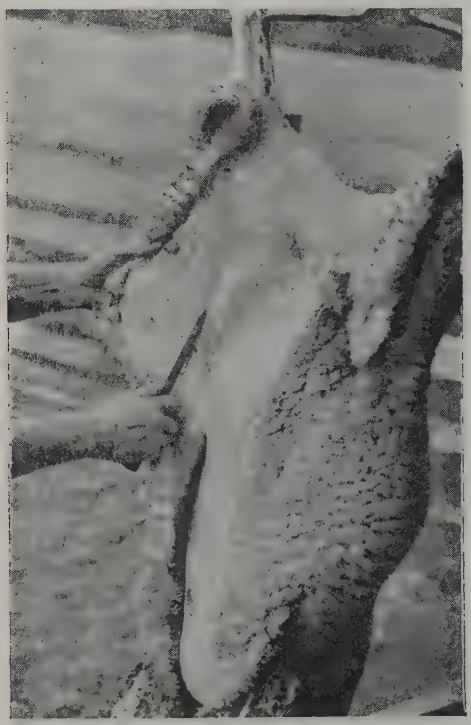


Fig. 12.—The carcass is placed on the gambrel and skin opened down centre-line of belly. Pull carcass to one side so that its weight keeps the skin taut as flanks are freed by careful use of the knife. Keep knife well out on skin.

Fig. 13.—Push carcass away from you when freeing opposite flank.

against the skin and press with a twisting motion towards the flesh to free the skin. Free sufficient skin with the knife to permit the skin to be "fisted" off in the same manner on the outside of the leg, working off the point of the shoulder and down the side of the neck (Fig. 4).

Cut the foreleg joint (Fig. 5) and free the foreleg, then repeat the process on the other foreleg.

Brisket.—With both forelegs freed from the skin, loosen the skin at the point of the brisket. The skin is usually very firmly attached at this point, but will come away fairly easily if handled as shown in Fig. 6.

The skin at the point of the brisket is held in the right hand, with the left hand underneath to serve as a fulcrum. A rolling movement will usually detach the skin along the brisket, and the skin along the sides of the chest can then be "fisted" off using the clenched fist with a screwing or twisting motion which frees the attachments between skin and flesh.

The "fisting" is continued across the belly from side to side until the skin is freed to a depth of several inches (Fig. 7).

Fig. 14.—Fist off the skin keeping well behind the shoulders.

Fig. 15.—Continue fisting upward to clear hind legs.

Hind Legs.—Move to the hind legs and handle in a similar manner to the forelegs. Open the skin near the hock and cut down in a straight line to the bare area under the tail.

Using the knife carefully, free the skin on the outside of the leg (Fig. 8). On the inside merely free the skin around the joint.

Now continue "fisting" the skin from the flesh (Fig. 9) until the leg is exposed. Cut through the joint below the hock and break off with a sideways pressure. Slip the knife through the thin membrane between the leg and the "hamstring" to admit the gambrel (Fig. 10).

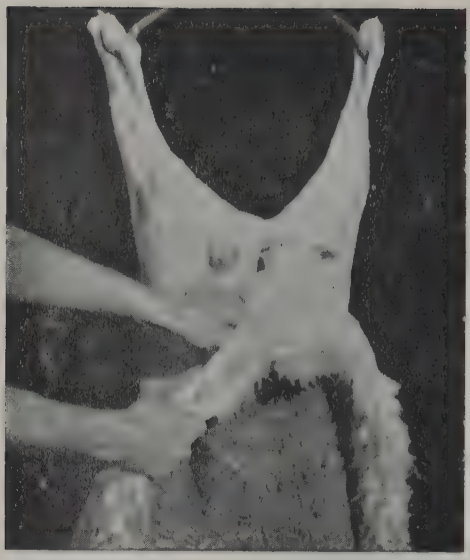


Fig. 16. Free tail and rump in same manner.

Repeat the process on the other hind leg, and then, using the knife carefully, free the skin from the underside of the tail and round the vent. Hold the tail in one hand and it will then be easy to pull the skin free of the flanks (Fig. 11).

The carcass is now ready for the gambrel to be inserted preparatory to hoisting. Before hoisting, open up the front of the neck and free the windpipe and gullet from the head. The gullet or food channel is attached to the rear of the windpipe. Cut off a section of the windpipe and tie a knot in the gullet to prevent the contents of the paunch or rumen from running out when the carcass is hoisted.

With the carcass hanging at a convenient height, use the knife carefully to free the skin from the tail.

Fig. 17.—A strong outward pull will strip the skin down to the neck.

Open the skin down the centre-line of the belly, then proceed to free the skin from the flanks using the knife. This operation is simplified if the skin is grasped firmly in the left hand and the carcass pulled towards the operator so that its weight keeps the skin taut (Fig. 12).

The knife is kept well out on the skin, about an inch or more from the flesh, and a few light touches will allow the skin to pull free. On the opposite side, push the skin away so that the carcass is out of the perpendicular again (Fig. 13) and free the opposite flank.

With both flanks freed, continue "fisting" off the skin working diagonally downward and toward the backbone, keeping well back behind the shoulder to free the fore-legs (Fig. 14).

Fig. 18.—Cut skin free from head leaving the ears on the skin.

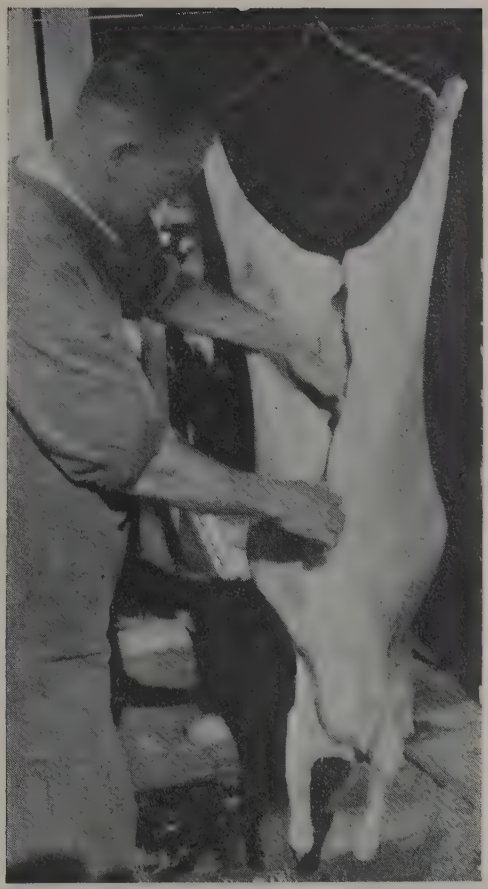


Fig. 19.—Opening up the carcass.

Continue the "fisting" off in an upward direction to free the hind legs (Fig. 15) and then work upward and across the back to free the tail and rump (Fig. 16).

Seize the two hind feet and a smart outward pull will now strip the skin clear of the back right down to the head (Fig. 17). The ears must be left on the skin which is now cut free from the head (Fig. 18).

Hang the skin, flesh upward over a rail in the shade to dry, and then return to the carcass and remove the head. If the neck has been broken correctly, this should be a simple matter.

DRESSING

Two semi-circular strokes with the knife will free the vent and hind gut, allowing them to drop into the abdomen. Cut down to the bone between the hind legs, then starting from the cod, or udder in the case of a ewe, open up the carcass down the centre line to the point of the brisket. Insert two fingers in the opening as soon as there is room for them (Fig. 19), keeping them just ahead of the knife to avoid cutting the paunch which will fall forward.

Fig. 20.—Throw small intestines over to left and remove caul fat.

Fig. 21.—Cutting through the brisket.

Remove the caul fat from around the paunch and throw the small intestines over to the left (Fig. 20) so that the caul may be detached easily.

Detach the hind gut by pulling forward and slightly upward and allow it to hang down.

The abdominal organs are attached to the backbone in two places, one just below the kidneys and the other near the liver. A touch of the knife at each point will free the "innards," after which the hand can be slid down to lift them out—another touch of the knife being sufficient to free the gullet or oesophagus.

Now place the left forearm crosswise in the body cavity (Fig. 21) to spread the carcass and cut or chop through the brisket. Continue downward and open up the neck.

Two semi-circular cuts through the diaphragm (Fig. 22) will expose the heart, and lungs which, with the liver, are freed from their attachments and removed by a downward and outward pull.

Fig. 22.—Two semi-circular cuts through the diaphragm expose the heart and lungs.

Fig. 23.—The carcass dressed and ready for cutting when cooled.

The carcass should now be wiped down and placed in a cool spot to "set." If these instructions have been followed carefully it should present the attractive appearance shown in Fig. 23.

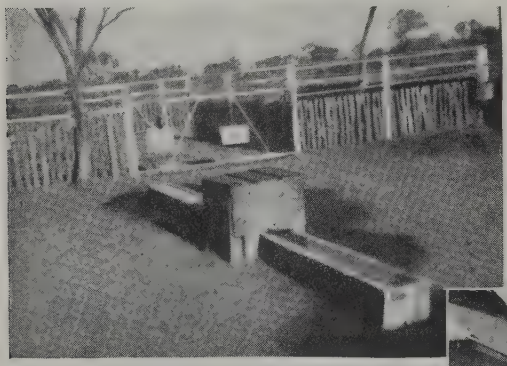
CAN A BLACKFELLOW DO IT?

SOME IDEAS FROM THE STATION COUNTRY

By W. M. NUNN, Officer-in-Charge, North-West Branch

THE title of these notes should not be taken to infer that we wish to takes sides in the controversy which rages periodically in many popular news chronicles. We agree that there are good and bad in all races and in all colours, but as an aboriginal stationhand is the man responsible for carrying out many of the odd jobs on the station it is generally he, and not the boss, who is responsible for the failure to put the plug back into the sheep trough so that water runs to waste and sheep may die of thirst.

Howard Bros., of Albion Downs Station, south of Wiluna, use our title as their motto and their yardstick in relation to the planning and construction of fool-proof devices on the station. The water trough illustrated here shows its application. The ball-tap is well protected by a stout covering and the cement troughs have no draining plugs.



Failure to replace the plug generally occurs when the trough is being cleaned out, hence the introduction of this pattern of trough by Howard Bros. A piece of rubber belting cut to fit the trough section is used as a scraper when cleaning the trough, this being inserted at one end and drawn along to the other to remove all foreign matter. The bottom of the trough is sloped upwards at the ends so that a good "follow through" puts all the debris right overboard. Possibly the blackfellow could lose the square of belting but he certainly could not lose the plug and cause the trough to be empty when the water is most needed.

Also illustrated is the labour-saving circular approach to the Albion Downs shearing shed. The gate shown lying back against the shed in the photograph is hinged on a central post and follows the sheep around the circle forcing them up to the ramp. With this device one stationhand pushes the sheep into the ramp without fuss or bother instead of having six to wave and yell.

INSECT Pests AND THEIR CONTROL

By B. A. B. EDWARDS, B.Sc. (Hons.), Entomologist

THE POTATO MOTH

(*Gnorimoschema operculella*, Zell.)

THE potato moth is almost a world-wide pest and one which under favourable conditions can cause great havoc to both growing and stored potatoes. The term "potato fly" is almost universally applied to this pest by growers, but the insect is a true moth and so the name fly is quite inaccurate.

The adult moth is an inconspicuous creature measuring only a little over ½in. across the spread wings. The front pair of wings are grey and slightly speckled with darker markings. In some lights they exhibit a distinct metallic sheen. The hind wings are a uniform light grey and fringed with extremely fine hairs.

LIFE HISTORY

From 100 to 300 tiny white eggs may be laid by each female and, under field conditions, these will be laid on the underside of the leaves or upon exposed tubers. The eggs may take from five days to several weeks to hatch according to weather conditions.

The fully-fed caterpillar is pale greenish-white in colour, measures a little over ½ in. in length and takes about 17 days under favourable circumstances to reach the pupal stage. Before pupating, the caterpillar spins a light silken cocoon and these cocoons may be located, according to whether potato tops or tubers are infested, either in curled dry leaves, protruding from feeding tunnels, in the eyes of potatoes, attached to the sides of bags in which potatoes are stored or under clods in the field. The length of the pupal period is a little over a week under good conditions, but may be protracted for a month or more.

Fig. 1.——Potato Moth (magnified six times)
Photo, Virginia Experiment Station Bulletin.

TYPE OF INJURY

In Growing Plants.

In the case of foliage infestations, the young caterpillars quickly eat into the leaf and feed between the upper and lower surfaces causing colourless parchment-like

Fig. 2.—The upper picture shows potato leaflets showing various stages of "mining" by potato moth caterpillars. In the lower picture, terminal injury to young potato plants is shown

Photo, Virginia Experiment Station Bulletin.

patches to appear. From the leaves, the caterpillars may work down the leaf stalks into the stems causing various portions of the plant to wilt and die.

In Tubers.

When tubers are attacked, the caterpillars usually commence working near an eye and the first indication of trouble is often the appearance of black specks of excreta in this region. When the attack is of some standing, irregular worm-like tracks may be seen beneath the potato skin showing the feeding movements of the caterpillars, and the cutting of the tuber will reveal deep tunnels running in all directions.

HABITS AND SEASONAL OCCURRENCE

The potato moth is nocturnal in its habits and so is often overlooked when light infestations only are present. In the field, the eggs laid are mainly upon the growing tops, but if any tubers are exposed or any deep cracks allow the moths to penetrate the soil, then the developing potatoes may be attacked.

It is undoubtedly during dry summer conditions that the potato moth is most destructive for it is then that the life cycle is completed most quickly and that the dry, cracked soil provides the most ready access to the subterranean portion of the plant. Not only will the moths enter cracks in the soil in search of tubers, but when through drought and "grub" attack, the potato tops wither and die, the caterpillars will leave the drying foliage and crawl under the clods to attack the crop waiting to be dug.

CONTROL

In the Field.

Cultural Methods.

Tubers should be planted as deeply as possible so that, in the event of soil cracks, moths and caterpillars will not have easy access, and so that developing tubers will not break surface as they grow and mature.

The constant hoeing and cultivation of the ground and the hilling up of the soil along the rows will also prevent cracking and keep the tubers well protected. A plentiful water supply is probably the main cultural factor in checking the pest, for moist soil seldom cracks and offers considerable resistance to penetrating "grubs" or moths and is usually favourable to sturdy plant growth.

For the foregoing reasons it is mainly summer grown potatoes that are severely attacked. Cold moist soil is so detrimental to the development of the pest, that even when infested tubers are planted under such conditions, little fear of subsequent losses need be feared.

Chemical Treatment.

The growing crop should be sprayed or dusted with DDT as soon as moth activity is observed. A bad infestation of caterpillars in the tops will not only affect adversely the general growth of the plants and so reduce the yield but will also provide large numbers of grubs to attack the tubers as they lie on the ground after digging. Dust or spray preparations may be used to treat field crops. If dust is used, a 2% mixture is recommended at from 25 to 50 lbs. of dust per acre, depending on the size of the plants and the severity of the infestation. Where a spray mixture is applied, a 0.1% preparation is suggested at up to 100 gallons to the acre. If a low volume spray unit is used, however, a good cover can be obtained with 10 gallons. If a 20% DDT emulsion is used for low volume spraying, 2 pints of emulsion per acre will be required for a ½ lb. application of actual DDT. The emulsion can be diluted in accordance with the output of the spray unit.

Where large plants are badly infested with moth or conditions are favourable for moth breeding, treatments, whether dust or spray, should provide for 1 lb. of actual DDT per acre. On small plants and where infestations are light, less DDT may be effective.

In Store.

After being dug, potatoes should be bagged and removed from the field as soon as possible. If they must be left out overnight, the bags should be sewn and turned upside down to make it increasingly difficult for wandering moths to reach the tubers. On no account should potato tops be used as is so often the case, to cover the mouth of the filled bag awaiting sew-

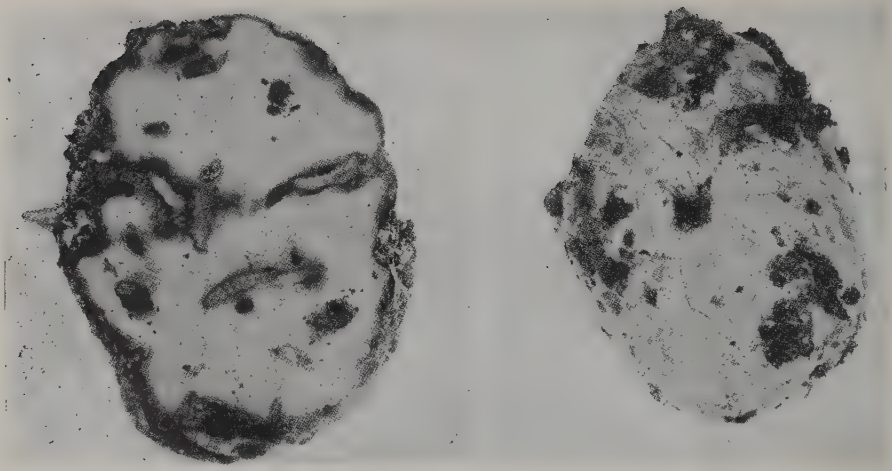


Fig. 3.—Left: Severely infested tuber cut to show potato moth larvae in tunnels.
Right: External view of potato moth injury. (Magnified by two.)
Photo, Virginia Experiment Station Bulletin.

ing, for caterpillars will quickly leave the wilting foliage and crawl down to be a future trouble in the stored potatoes.

The tubers may be dusted in store with 2% DDT or proprietary derris dust.

How to Dust Tubers.

(a) Dust the empty bag on the inside either by means of a dusting machine or by hand, and as the tubers are introduced further puffs or handfuls of dust should be added. Using this method, up to ½lb. of dust is required per bag.

(b) A convenient method of applying dust is to gather potatoes into a bucket before bagging. An ounce of dust should be placed in the bottom of each tin, and as each bucketful is tipped into the bag the dust will be spread through the tubers. A few ounces of dust should be sprinkled into the mouth of the bag before sewing.

(c) When the tubers are dug and whilst lying on the ground they may be covered with a film of dust applied by means of a hand dusting machine at the rate of 20-25 lbs. per acre. The potatoes may then be bagged in the ordinary way.

The storing of potatoes in bags previously dipped in 2% D.D.T. emulsion and allowed to dry will also reduce the chance of moth infestation.

Important: Do not use a DDT dust stronger than 2%.

Do not use BHC or "Gammexane" dust, or composite dusts containing BHC, as this material may taint the tubers.

Residue Hazards.

Tests carried out in conjunction with the Department of Public Health and the Government Chemical Laboratories have shown that no dangerous residues will be present on potatoes treated in accordance with the above instructions.

Fumigation.

Where a severe infestation is feared in stored potatoes the tubers may be fumigated in any gas tight container such as a tank, room or drum, with carbon bisulphide. The liquid fumigant gives off a heavier-than-air gas and so should be applied to the top of the potato stack. Pieces of bagging soaked in the liquid may be placed on the stack or the fumigant allowed to evaporate from shallow trays. The amount of fumigant required is 2 lb. per thousand cubic feet of space or for small lots about two tablespoonsful to the bag. If serious gas leakages are suspected, then more fumigant should be used. The potatoes should be kept sealed for at least 24 hours. If treatment is being given in the summer months and a tank or drum is being used, a shady spot should be chosen otherwise the potatoes may be scorched and "cooked" by the heat.

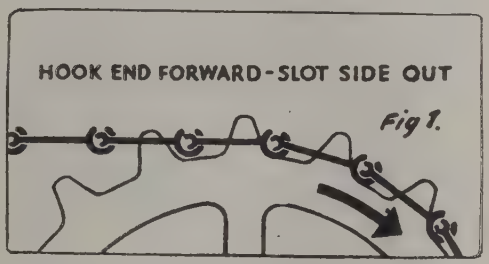
THE CARE AND MAINTENANCE OF BINDERS

THE need for proper care and maintenance of farm machinery cannot be stressed too strongly. This timely article on the binder has been prepared by the National Institute of Agricultural Engineering, England, and appeared in the Journal of the British Ministry of Agriculture. Farmers are urged to put into practice the advice and instructions given in this article.

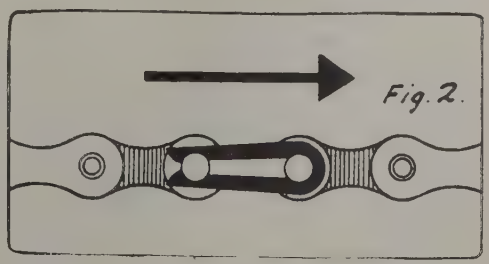
There are over one hundred lubrication points on a modern tractor binder. Grease all round first thing in the morning and once again during the day; but, on a long day, lubricate fast-moving parts at least three times. Start at one point and work systematically round the machine so that no parts are missed. Where oil-baths are fitted, see that the oil is maintained at the proper level with the correct grade of oil; used sump oil must not be used for binder lubrication. Chains should not be lubricated in very dusty conditions, especially where the soil is of a "cutting" nature.

Canvases.—Check over all canvases before harvest and attend to any necessary repairs at once. When putting canvases on see that they run **buckles first,** and that the flaps are well laced down. Make sure that all straps are tightened evenly, or the canvas will creep towards the tight side. Do not run canvases too tight; run them tight enough to drive without putting undue strain on the rollers. If, after the above points have been followed, a canvas still does not run true, check the rollers to see that they are parallel. This is done by measuring diagonally from the left-hand edge of one roller to the right-hand edge of the other, and vice versa. These two measurements should be the same. If they are not, adjustment can be made by lengthening or shortening the cross members that brace the frame carrying the canvas.

Chains and Gears.—Be sure that all chains are fitted to run the right way round (see Fig. 1). With a roller chain, the clip holding the joining link should be fitted as shown in Fig. 2.



Do not run chains too tight; they should be slightly slack, but not so slack that the chain can flap against a part of the machine or jump a tooth on the sprocket. If chains keep coming off, and the tension is correct, make sure that all the sprockets are in line. Keep all gears free from rubbish. An accumulation of dirt, straw and similar material between the teeth may



prevent them from meshing correctly. When properly adjusted there should be just a little play or "back-lash" in the gears. (This should be checked in a number of places by turning the gears round a little at a time.)

Cutter Bar and Knife.—Note that each section centres on every other finger (6-in. travel), whereas a mower knife section centres on each finger (3-in. travel). The general condition of this part of a binder is not so vital as is the case with similar parts in a mower; but the following points should be noted:—

(a) All rivets should be kept tight, especially on the knife head. Where a rivet has become slack in its hole, fit a new one.

(b) See that all the knife sections and fingers are in line. Any that are not can be adjusted carefully with a hammer.

(c) The clips should hold the knife firmly on the ledger plates; but do not tap them down too far so that they bind.

(d) Excessive wear, usually found on the older wooden pitman bearings, will cause loss of motion, and the sections will not centre on the appropriate fingers.

(e) Lubricate the pitman bearings thoroughly; but do not oil the cutter bar or knife where grit can get on them.

(f) Never use a blunt knife, especially when there is any quantity of greenstuff in the bottom of the crop.

Twine Tension and Knife.—Twine tension is most important for the correct operation of the knotter, and should be checked with an ordinary spring balance as shown in Fig. 3.

Do not use tensions greater than those shown in the diagram, as the twine may break or become unthreaded, and strain is imposed on the knotter, leading to sheaves being discharged untied. Before the beginning of a season's work the twine-knife should be removed and sharpened with a carborundum stone.

During Use.—If satisfactory work is to be done there must be an operator on the binder unless it is fitted with levers within the tractor driver's reach. Do not work a binder too fast, especially over rough ground. About 3-4 m.p.h. should be the absolute maximum on level ground, using pneumatic tyres; but the tractor should be throttled down before crossing furrows, etc. **More binders are shaken to pieces behind tractors than are worn out in normal work.** If any stoppage occurs during work, back before restarting, so that the machine can gather speed before entering the crop.

Never let the fingers dig into the ground; this is likely to occur when there is a ridge in the land between the main wheel and the outside divider, or when crossing furrows. To get the required length of stubble, set the height of the binder on the main wheel and outside divider wheel, using the tilting lever mainly to make adjustments for unevenness in the land.

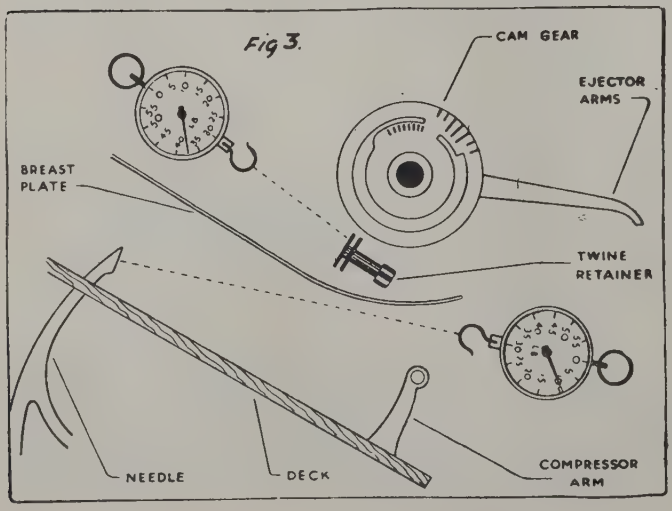


Fig 3.

In a heavy crop the ears tend to go up the elevator before the butts, so lower the machine and tilt up the front to retard the ears. On some makes of binder there is a strap of metal provided to run over the platform canvas, and this should be used to serve the same purpose. In a laid or tangled crop, neater sheaves can often be

made by frequent adjustments of the reel —both backwards and forwards, as well as up and down. Care should be exercised in doing this, to ensure that the crop is not thrown over the back of the platform. Where there is a great deal of greenstuff in the bottom of the crop it is better to leave longer stubble, so that the sheaves dry out more easily.

Powershafts.—When hitching a tractor to a power-driven binder, the powershaft should run, as nearly as possible, in a straight line, parallel to the direction of travel. Guards should **always** be used to prevent straw from winding round the shaft, as well as to reduce the danger of accidents.

It is very important to make sure that all bearings, particularly universal joint bearings, on a powershaft receive frequent and thorough greasing. Safety clutches should **never** be tightened down so that they cannot slip. If a clutch starts to slip after a long period of normal work, it is due to some trouble in the binder which should be found and corrected. The clutch should not be tightened without such an investigation.

Tying Sheaves.—While at work constant attention should be paid to the binding lever to ensure that the sheaves are tied as near the middle as possible. Any variation from the centre should tend towards the butts, rather than towards the ears. This applies particularly to winter oats, which tend to slip out of the bands if tied nearer the ears than the butts. The binding lever should be used to adjust the tying position of the sheaf; the buttor should not be used for this purpose, except in very short crops.

Varying Sheaf Size.—Where the trip and compressor arm are separate, the size of the sheaf should be varied by adjusting

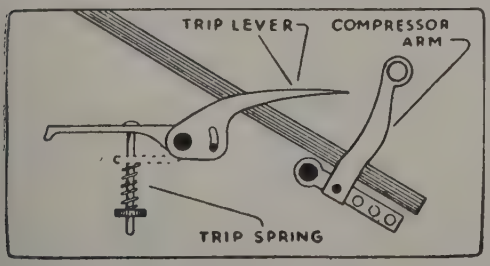


Fig. 4.—For a small sheaf: Set the compressor arm "in" and the trip lever "up"

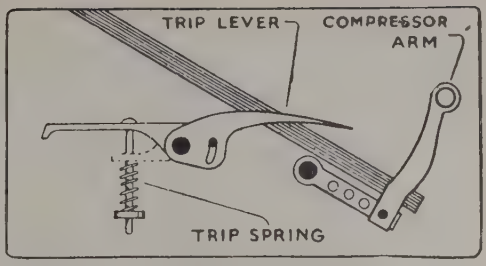


Fig. 5.—For a large sheaf: Set the compressor arm "out" and the trip lever "down"

the positions of the compressor arm and trip lever, and **not** by increasing the trip spring tensions.

Where the trip and compressor are in one, slight variation in the tension of the trip spring will be needed in addition to the adjustment of the position of the compressor arm.

For a Small Sheaf: Move the compressor arm in and decrease the tension of the trip spring.

For a Large Sheaf: Move the compressor arm out and increase the tension of the trip spring.

Varying Band Tension: Variation in band tension is effected by adjusting the trip spring tension; **on no account by variation of the twine tension.**

For a Tight Sheaf: Increase the trip spring tension.

For a Loose Sheaf: Decrease the trip spring tension.

Knotter Troubles.—If a new machine throws occasional untied sheaves there is no need to make adjustments at once. After half a day's work, when paint and general stiffness have worn off, the trouble will probably have ceased. Normally, if untied sheaves occur, it may be due to a weak place in the twine, rust on the knotter, a grain of corn in the bills, or rubbish temporarily blocking the knotter. In addition, a blunt twine knife can give rise to a number of troubles. **No adjustment should be made to the knotter itself,** until it is clear, by the frequent recurrence of some trouble, that the knotter is really at fault.

Before investigating knotter troubles the following points should be grasped:—

The operation of any knotter depends on correct timing (timing marks are provided on all gears for correct assembly).

(a) The needle is timed to deliver the twine into the twine retainer at the correct time.

(b) The twine retainer is timed to move on to grip the twine as soon as the needle lays it in the proper groove.

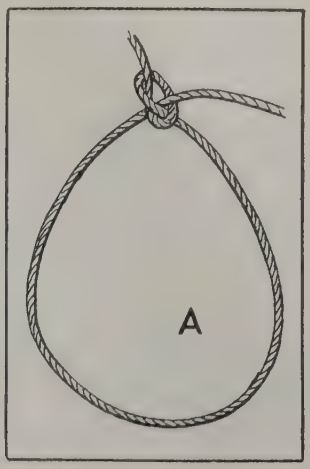
(c) The knotter bills are timed to turn when the twine retainer has gripped the twine.

(d) The bills are timed to open and close, to grip the twine, when it has been wrapped round them by their own rotation.

(e) The knife is timed to cut the twine while it is being held by the bills.

(f) Finally, the stripper and discharge arms are timed to pull the finished knot off the bills, so drawing it tight.

If any one movement in this sequence of events is interrupted by wear, damage, or faulty adjustment, the knotting mechanism will fail to tie the sheaf properly. It is important, therefore, that this sequence should be observed by turning the knotting mechanism slowly (by hand) in order that faults may be traced.



If this fails to reveal the fault the binder should be put to work and stopped immediately an untied sheaf is thrown; then, by finding the band and examining the ends, the fault may be traced in the following way:—

In this case a slip knot is tied round the sheaf, and the free end of the twine runs back to the needle (A).

This is due to the twine not being placed in the retainer by the needle for any of the following reasons:—

(a) The needle was timed too late, so that the twine retainer had moved before the twine was there to be gripped.

(b) The needle was bent and did not put the twine in the correct place.

(c) Greenstuff or other rubbish blocked the twine retainer or needle, so preventing entry of the twine.

The remedy lies in clearing away any rubbish if present, or adjusting the needle in one of two ways:—

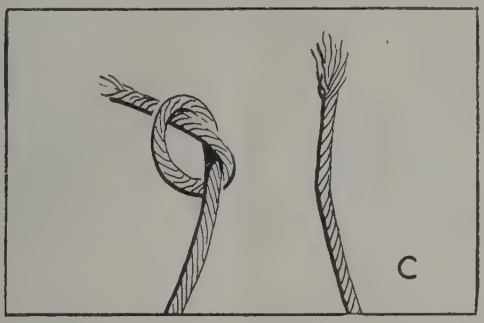
(i) See that the needle moves as far as possible into the mechanism without fouling anything; that is, have the needle "timed early." This is done by shortening the needle pitman, half a turn at a time, until the desired position is reached.

(ii) If the needle does not place the twine centrally in the notch of the twine retainer, the needle itself may be bent until it does so. (It is a malleable casting.)

Here the twine retainer is too loose, and one end of the band has been pulled from it before the knot was formed (B).

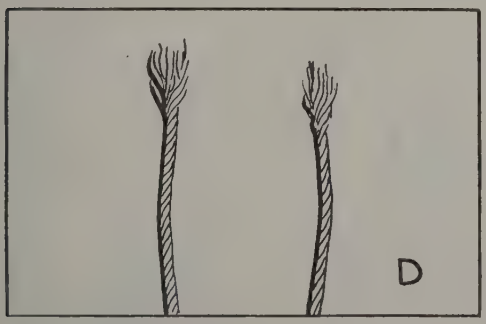
Tighten the retainer tension a **little at a time** until the trouble stops.

Here the twine retainer is too tight, and has "chewed" one end of the band in two before the bills made the knot (C).

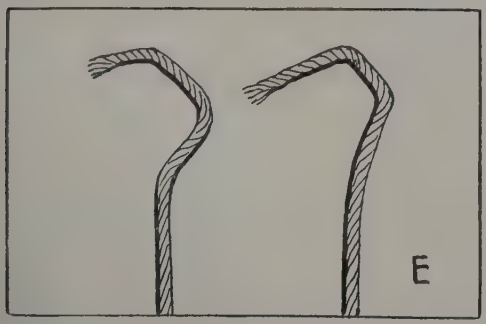


Slacken the retainer tension until normal bands are formed, and check the twine tension on the retainer as shown in Fig. 3.

When slip knots of the type (B) and (C) above are found on the bills the twine tension is **too great**; when found with sheaf the twine tension is **correct.**



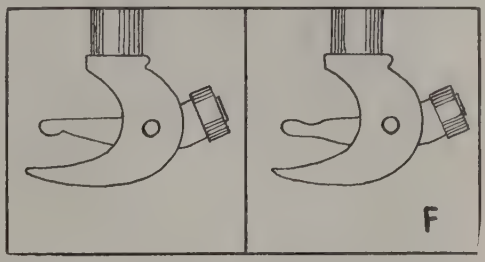
In (D) the retainer tension was so great that both ends were "chewed off" before the knot was formed. This is often caused by excessive tightening of the retainer tension in correcting fault (B), above. Slacken the retainer tension.



In (E) both ends show signs of bending, as a knot had been formed and had come undone. This is due to the tension on the knotter bills being too slack, and allowing the knot to slip out before being completed.

Tighten the bill tension a **little at a time** until the trouble is corrected.

The same trouble may also be due to the knob on the end of the upper bill hook becoming worn, and allowing the twine to slip out (F).



Fit a new hook or complete bills if they are badly worn.

If the binder casts a number of small sheaves, or sheaves of irregular size, it is a sign that the tying mechanism is not waiting, on the completion of a sheaf, until it is tripped for the next one; but carrying straight on without a pause. This is due to a fault in the locking and actuating mechanism situated at the front of the binding deck. It may occur because of any of the following reasons, and the remedy is usually the fitting of new parts:—

(a) Worn trip dog and stop (old ones may be ground into shape if not too badly worn).

(b) A broken dog spring.

(c) Worn rollers, etc., on the packer drive.

After Work.—A binder should never be left after a day's work unless covered with a sheet; usually it will be found necessary to use a few sheaves to ensure that rain does not drive under the sheet. If a binder is left overnight, or for a similar period, the canvases must be slackened.

Travelling.—When any long distance has to be covered always pack up the binder for travelling. Pull the reel back as far as it will go and turn it, if necessary, to ensure that no arms project beyond the general line of the machine; if any do, they should be removed. Unless pneumatic travelling wheels are provided, do not haul at high speeds on roads or rough surfaces. Great care should be exercised in passing through gateways.

Do not load the platform with a heavy weight of string, fuel or spare parts; this leads to distortion of the platform and damage to the canvas. Nothing should be placed on the platform unless the canvas is removed beforehand; it is not sufficient just to slacken it.

Storage.—A binder must always be stored under cover, in a place where poultry cannot roost on it, rain drive in on it, or odd things like sacks, oil-drums, etc., be put on it. Clean the whole binder down, using paraffin and a brush where necessary—for example, on the knotter and roller gearing. Remove the canvases and go over them for any breakages; have these repaired. Store canvases in a dry place away from rats and mice. Remove all chains and soak them in paraffin, clean them and store in waste oil until next season. Remove the knife, see that both this and the spare knife are sharp, and grease them thoroughly before packing away. Grease all fingers and similar bright parts to prevent rusting—especially the knotter bills—and grease all bearings thoroughly.

Where pneumatic-tyred wheels are fitted they should have all the weight taken off them by screwing down the main wheel, blocking up the binder to keep it level, and finally screwing up the main wheel again.

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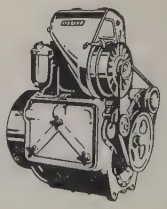

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INFECTIOUS SINUSITIS OF TURKEYS

By P. M. A. HARWOOD, M.R.C.V.S., Senior Veterinary Surgeon

INFECTIOUS sinusitis—also known as swelled head, turkey roup and nasal catarrh —is a disease which is responsible for the deaths of many turkeys every year. Even where birds recover from the disease, they are liable to be stunted and unthrifty and it is generally agreed that sinusitis ranks second only to blackhead as a source of mortality and financial loss.

The exact cause of sinusitis in turkeys has not yet been determined but it is almost certainly due to a filterable virus. The disease has proved difficult to transmit artificially but is apparently rapidly contagious under field conditions. There is no evidence that the disease can be transmitted from fowls to turkeys and vice versa, but recovered turkeys can become carriers of the infective agent.

Turkeys suffering from a deficiency of Vitamin A are predisposed to sinusitis infection, but the disease is quite different from true Vitamin A deficiency. This deficiency produces symptoms of nasal discharge, watery eyes and other typical "roup" manifestations, but the condition is observed principally in poults of three to four weeks of age and clears up rapidly when green feed, fish liver oils or other supplements rich in Vitamin A are added to the diet.

Sinusitis does not respond to corrections of the diet and may still occur when the birds have an adequate intake of Vitamin A.

Pustules in the back of the mouth, gullet and crop are a common symptom of Vitamin A deficiency. This feature is not seen in sinusitis.

SYMPTOMS

Turkeys of three to three and a half months are most commonly affected. The birds become listless and obviously sick, moping about aimlessly. They will be seen to shake their heads frequently and to cough and sneeze. Some birds will be observed to make swallowing motions from time to time or will scratch at the nostrils.

Mucous discharges from the nostrils and frequently from the eyes are common, while there may be foaming of the secretions of the eyes. The birds wipe their heads frequently on the feathers of the wings and backs and these feathers become gummed and soiled with the discharges.

The infra-orbital sinus, which is the cavity situated below the eye and communicating with the nostrils and mouth, becomes distended with an accumulation of mucous matter. A soft swelling which moves when pressed, fills up the area between the eye and the beak and when pressure is applied to this swelling a mucous discharge is forced from the mouth and nostrils. The secretion is watery in the early stages but later attains the consistency of a thin paste.

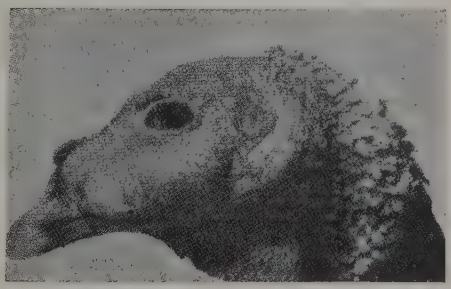

Fig. 1.—A turkey suffering from infectious sinusitis. Note the swelling below the eye caused by an accumulation of mucous matter in the sinus.

(N.S.W. Agricultural Gazette.)

The swellings may become very large and cause the eyes to close. In some birds, laboured breathing and gurgling sounds are heard and the infection may extend into the lungs and airsacs along the windpipe.

Infected birds lose interest in food and gradually waste away. Death usually occurs within 12 to 18 days but birds which survive longer than this often recover. The death rate varies in different outbreaks and may reach 80 to 100 per cent. of the birds affected. Recovery takes four to five weeks or even longer and birds have been known to show symptoms for some months. As previously stated recovered birds are usually stunted and unthrifty.

POST MORTEM APPEARANCES

Upon examination of a dead bird it will be found that the sinuses are distended with material which varies from a watery mucus to a thick sticky substance, or even to a dry cheesy deposit in a few cases. The lining of the sinus may be slightly inflamed, and in a few cases the lungs and air-sacs may also be affected.

PREVENTION

The utmost care should be taken not to introduce infected or carrier birds into a clean flock. It should be remembered that apparently healthy birds may have recovered from an attack of the disease and could still be carrying the infection. All introductions into a flock should be regarded with suspicion and such birds should be kept in isolation for a month.

Correct feeding plays an important part in preventing sinusitis. As stated previously, although this is not a preventive, an adequate intake of Vitamin A in the form of fresh green feed or fish liver oil will help to build up a resistance to sinusitis. Feeding should be adequate in quantity and well-balanced. If the birds are well fed from hatching to marketing they will have a good opportunity of withstanding infection.

Contamination of the drinking water is a factor which hastens the spread of disease as affected birds often cough and sneeze mucus on to the surface of the drinking water. All drinking vessels should therefore be kept scrupulously clean and scalded out at intervals.

TREATMENT

Before any medicaments are used, the affected sinuses must first be drained. This is best effected by means of a 16-gauge hypodermic needle which is inserted into the sinus. The syringe is then attached and the mucus is sucked out of the sinus. In cases where the exudate has become caseous (cheesy) the sinus must be carefully opened with a sharp knife and the material carefully picked out.

Several medicaments are used for irrigating the sinuses after the withdrawal of the exudate. Whichever is used, the technique is the same:

1. Two hypodermic syringes fitted with a wide bore (16-gauge) needle are used.

2. The needle is inserted into the sinus and the exudate withdrawn with one syringe.

3. The syringe is removed from the needle which is left in position. Another syringe is then fitted and 1 to 2 ccs. of medicament injected slowly into the sinus.

4. Even where only one sinus is affected, it is desirable that both should be treated.

Fig. 2.—Inserting the hypodermic needle into the sinus to withdraw the mucus.
(After Hinshaw.)

The drugs used are:—

Silver Nitrate—2ccs. of a 4 per cent. solution are used. The drug is irritant and results in a temporary severe swelling of the sinuses, which subsides in three to four days.

Iodine—1 cc. of tincture of iodine, either weak (2½ per cent.) or strong (10 per cent.) solution may be used.

Streptomycin—This is the drug of choice as it is both highly effective and non-irritant. It is, however, much more ex-

Fig. 3.—The needle left in the sinus after removal of the syringe. It is then in position for the injection of a suitable medicament.

(After Hinshaw.)

pensive than either silver nitrate or iodine. The sinuses are drained in the usual way and 100 mgms. of streptomycin dissolved in 2 ccs. of sterile water injected into each sinus. A prescription from a veterinarian is necessary to obtain this antibiotic.

Streptomycin is available at a retail cost of approximately 5s. 9d. per gram, which is sufficient to treat five birds.

In spite of the relatively high cost of treatment compared with silver nitrate, the drug is highly recommended on account of its high efficiency and the immediate improvement observed in the birds treated.

As there is no inflammation of the sinuses following injection, the birds will normally commence to feed immediately after treatment. This is in direct contrast to the silver nitrate treatment.

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PERMANENT STRUCTURES FOR IRRIGATION FARMS

By A. H. BOSCH, Dip. Trop. Agric., Technician, and K. S. COLE, B.Sc., Agri., Irrigation Adviser

WITH the close of the irrigation season many farmers have put away their shovels with sighs of relief. Now no doubt they have forgotten, due to the passage of time, the many battles with unruly water. Perhaps they have even forgotten the arduous hours of shovelling and the attendant backaches.

Rather than forgetting these problems they should be now planning countermeasures. Now is the time to put into operation plans for the coming summer. In a few months the irrigation zones will open and a flurry of last-minute preparations and half-hearted solutions will usher in another season of hard work and bad temper.

A careful study of the accompanying plans should reveal structures to suit every farm. Although basically designed in tim-

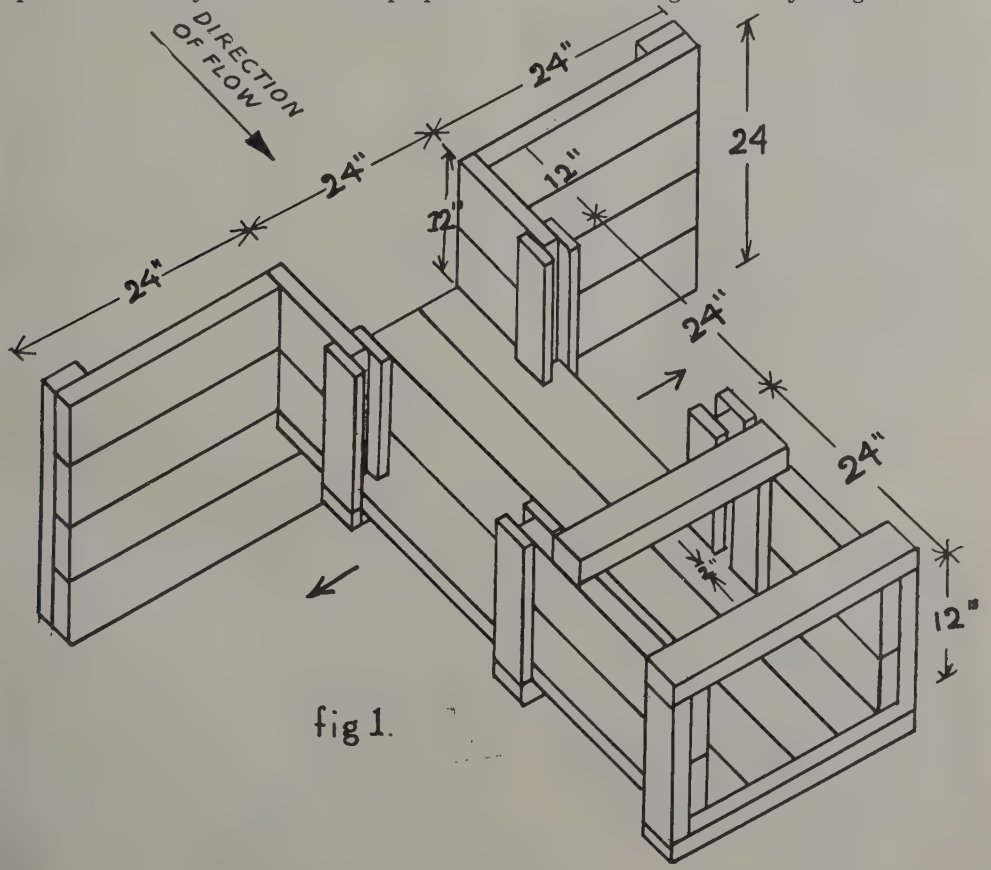


fig 1.

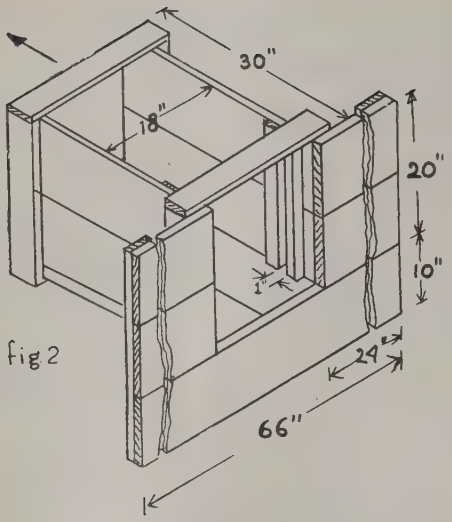
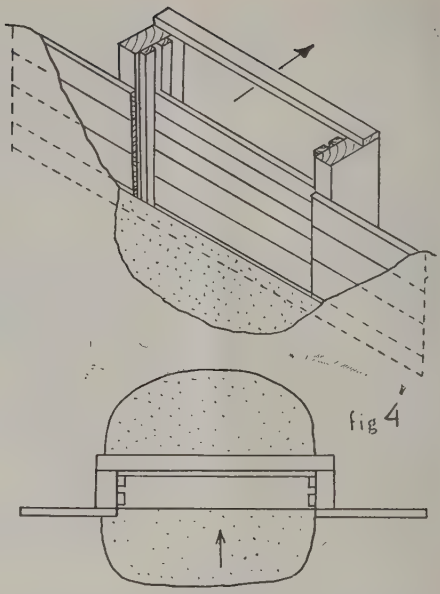


fig 2



ber, most of the designs are capable of being manufactured in concrete, if a few modifications are made to the design.

Generally, farmers will find the timber structures easier to deal with. If concrete is used, it must be poured *in situ* and this is not always easy in winter. Further, reinforcing must be adequate or the structure will collapse or crack so badly as to be ineffective. There is probably very little difference in price between the two materials, but timber must be purchased to make the forms for concrete. Such materials as sand, metal, reinforcing rod may have to be carted long distances or else be hard to obtain. There is very little difference in working life of the two forms of material. Jarrah should last at least 20 years if the structures receive some form of maintenance such as termite-proofing and the replacement of rusted nails, etc., as necessary.

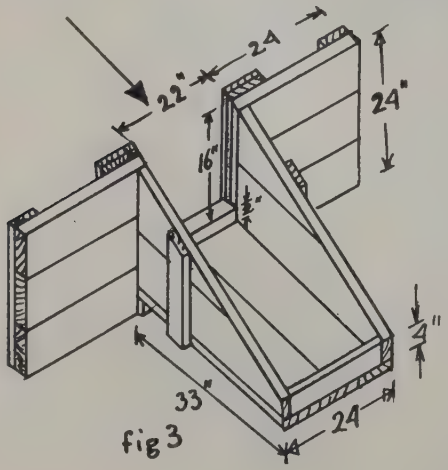


fig 3

Some designs have suggested measurements included, but it must be borne in mind that these measurements will vary according to channel and flow size, and are only intended as a rough guide for interested persons. It is essential that certain dimensions should always be in proportion to other dimensions of the design.

For example—the take-offs as in plan 1 must be equal in size to the inlet throat. Wings, which are placed in the bank to prevent movement of the structure and the passing of water round the structure, must be of sufficient length to give good anchorage, and minimum size should be equal in length to the width of the throat opening. The greater the length, within reason, the safer the structure becomes. It must always be remembered that moving water is an insidious enemy and will always find faults, should they exist, in any structure designed to control it. Once a break

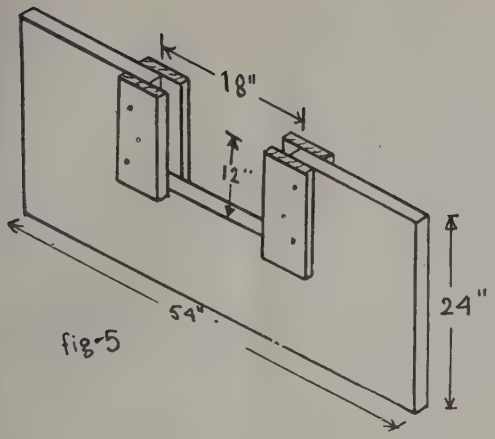


fig-5

occurs, the trouble entailed in recontrolling the water is guaranteed to test the temper of the most placid type. Where concrete or wooden aprons are provided for stops or drops, designs 2, 3, 4, 5 and 6 should be equal to and preferably twice the length of the total drop of water, i.e., if the water is held up 12in. in a stop the apron must be at least 12in. and if possible 24in. long on the downstream side.

The necessary boards for closing off stops can be cut from 2in. x 1in. or 3in. by 1in. timber. Usually it will be found advantageous to have a number of boards of each size for every individual stop. By this means the farmer is able to vary the effective height of the stop to suit changing conditions of water flow. The wall and floor boards can be made of 5in. x 1in. or 6in. x 1in. jarrah. Wider boards are not recommended due to cracking and warping. Generally suitable uprights, struts, etc., can be constructed from 3in. x 2in. jarrah except in design 4, where suitable uprights and base board can be cut from an old railway sleeper.

By studying diagram 11, it will be readily seen where the various designs may be used to advantage.

Plans 1, 2, 3 and 4 are fairly simple and should be relatively cheap to make. Any handyman can cut the components in the workshop and, in most cases, can assemble the structure in the workshop during rainy weather. Plan 5 is also simple in design but care will be necessary if cracking is not to reduce its effectiveness.

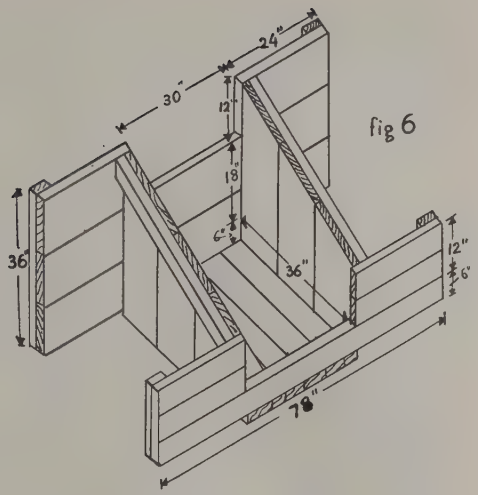


fig 6

Plan 1 gives great ease of water control where a body of water must be split up in two or three directions. By careful regulation of the stop boards it will be found possible to split any supply in any proportion desired.

Plans 2, 3, 4 and 5 are of stops which are required to build up the height of water in the channel so that the water may be applied to the land. Plan 4 is probably the cheapest and simplest to make. Once again the height to which water is held up is readily adjustable by altering the number or size of the drop or retaining boards. With all stops it is essential that a concrete apron be used on the downstream side.

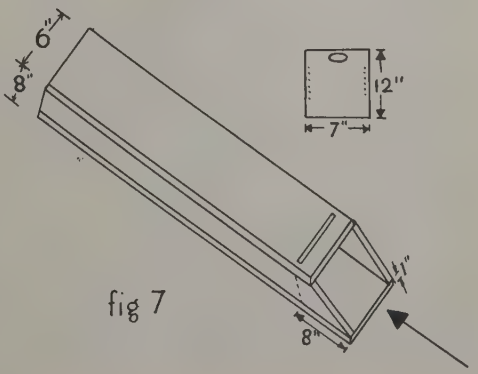


fig 7

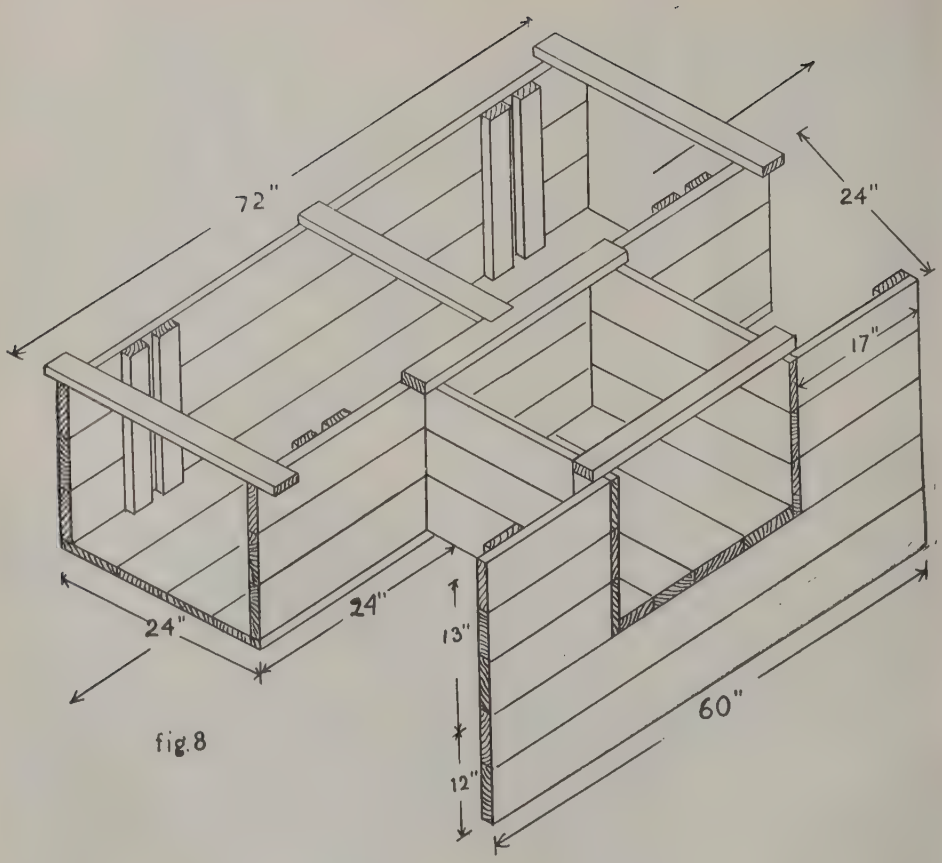


fig.8

Plan 6 is of a simple, easy to construct drop for taking fall out of a channel. It cannot be recommended that such drops be constructed to take out more than two feet of fall in any one drop. If three or four feet of fall must be taken out then two or more drops should be used. The value of this structure may not be readily discernible to the average farmer on fairly flat ground. To the man farming relatively steep irrigation country with its risk of channel scouring, particularly if the soil is somewhat light, this plan will remove a severe "headache" at small cost. With this structure it is essential that it be very well bedded into the walls and bottom of the channel and a good stilling pool effect to prevent scouring below the drop.

Plan 7 is a very cheap and effective means of taking water from the head ditch into bays or minor head ditches. The troubles caused by continually cutting the bank, to bring water on to the land, is not only removed but more positive control is achieved.

Plan 8 will not be required on many farms as conditions suitable for its use seldom exist. Where conditions are suitable, it is a very useful addition to water control.

Plan 9 is a rather complicated arrangement for positions where drains and channels cross. Wherever possible it is much easier and cheaper to siphon one under the other with a concrete pipe. Should

such a procedure not be practical, then the farmer will be forced to resort to a structure similar to plan 9.

Plan 10 is included to show the correct way of installing concrete pipes in channels and drains. To avoid the evils of silting up, or stagnant water with its complement of weeds and insect pests, the pipe must be correctly sited. The pipe must be approximately half its diameter below the invert or bottom of the drain. Contrary to popular opinion, this will not cause undue silting, but will tend to clean the pipe by increased flow of water due to the extra volume that can enter the pipe. It is essential to concrete an inlet and outlet throat for such pipes or the rush of water will scour the channel invert. Also the inlet throat must be relatively smooth to minimise swirl and the consequent bank erosion.

Having decided upon the designs to suit his farm the farmer must now prepare the sites. Stops and drops can often be sited on past experience. To obtain real accuracy the area needs to be surveyed and the sites picked by dumpy level readings. Field officers of the Irrigation Branch are always available to do this job for farm-

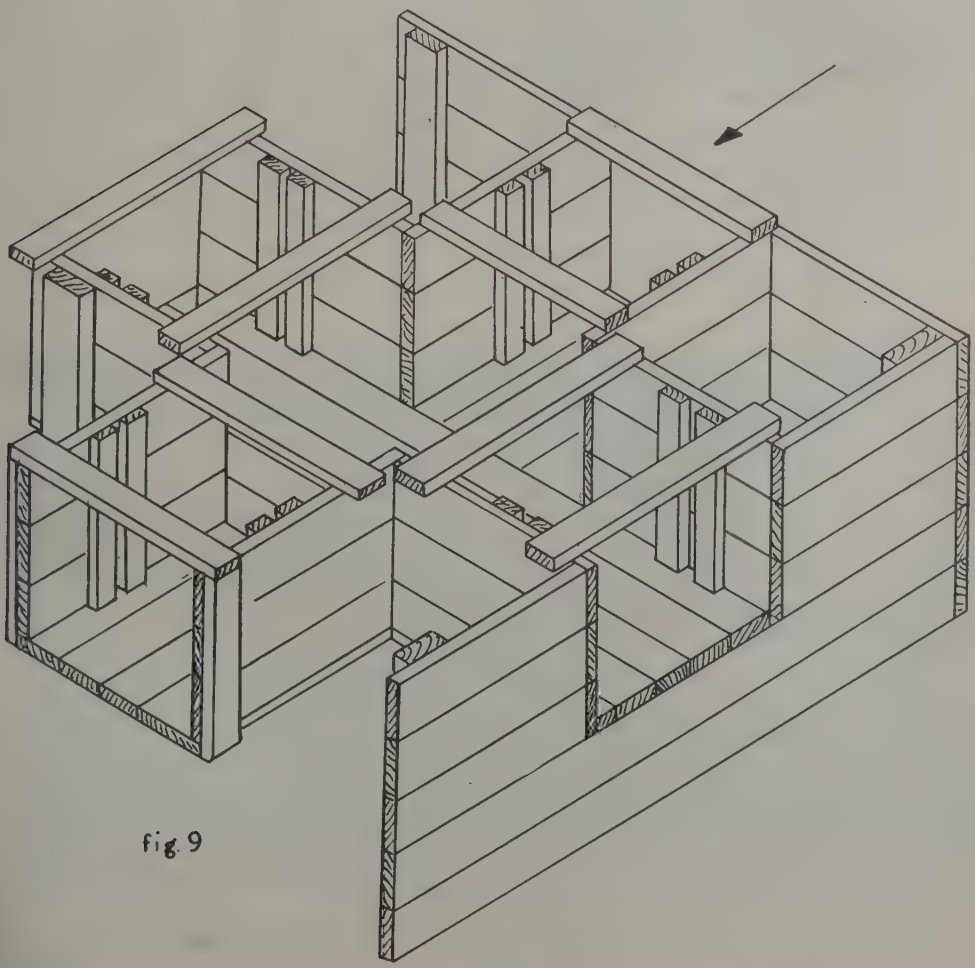


fig. 9

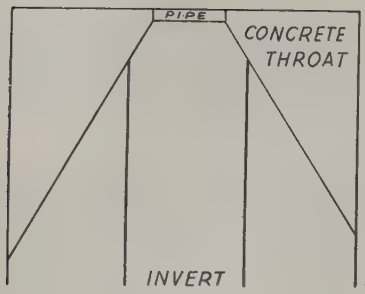
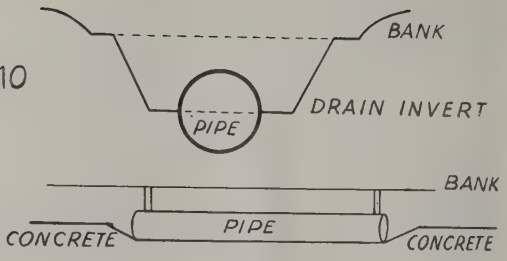


fig 10

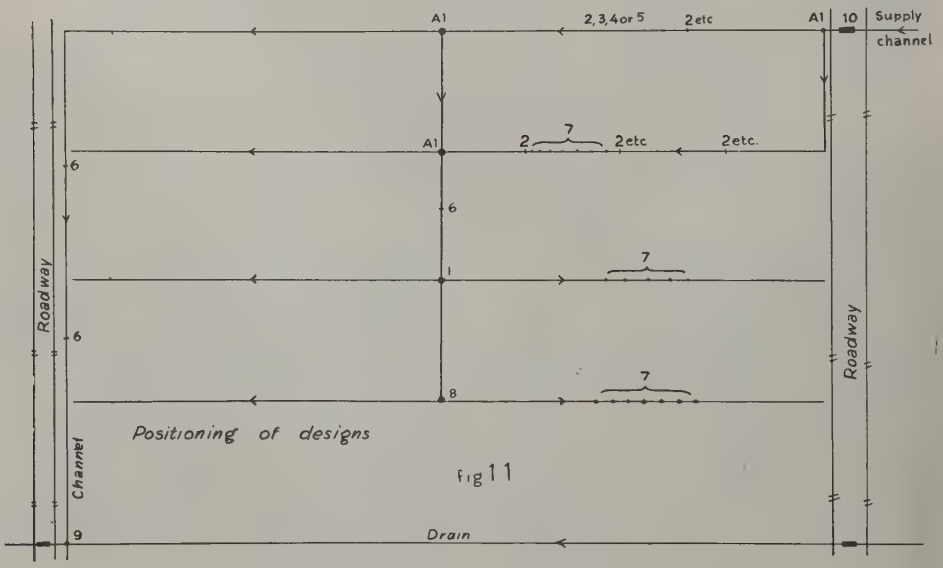


ers. Once the sites are picked the channel in the immediate vicinity should be cleared to correct depth and width and the necessary excavations made. The structure is installed and the earth returned and well rammed. The longer the period between installation and use the greater the stability of the soil and structure.

Small leaks in stops and diversions can usually be cured by hanging a bag over the boards in such a way that the pressure of water forces the bag against the stop boards. In the case of plan 7 a handful of earth placed against the plate will be forced into cracks and crevices and will prevent leakage under the stop plate.

The ease of water control obtained will more than repay the capital cost of the structures shown.

The authors are indebted to the Washington State College, U.S.A., for some of the designs used.



Positioning of designs

fig 11

THE PREPARATION OF FRUIT FOR MARKETING

By J. S. BLOOMFIELD, Packing Instructor

Part 3—Packing the Crop

PACKING is the most important of the factors which contribute towards fruit presentation. It is the skilled job which is the culmination of the grower's efforts to grow and harvest his fruit and prepare it for market. The costs of growing and harvesting the fruit and the purchase of packing materials and cases, have already been incurred before the fruit is packed. The recoupment of these costs, together with further charges for transport and marketing, plus a satisfactory profit margin depends largely upon the skill with which the fruit is packed. To facilitate operations, standard packs have been designed to assist the grower in maintaining uniformity of presentation and by so doing promote the confidence of the buyer and ultimately the consumer.

The almost universal adoption of the mechanical sizer in packing shed practice in recent years, even by the smaller grower has meant that bench packing for most fruits is now seldom practised except for some varieties of pears and soft fruits, such as peaches. Nevertheless, although sizing has now been mechanised, the skilled job of packing must still be done by hand and the packer needs to be fully conversant with the various packs in relation to the variety, size and shape of the fruit

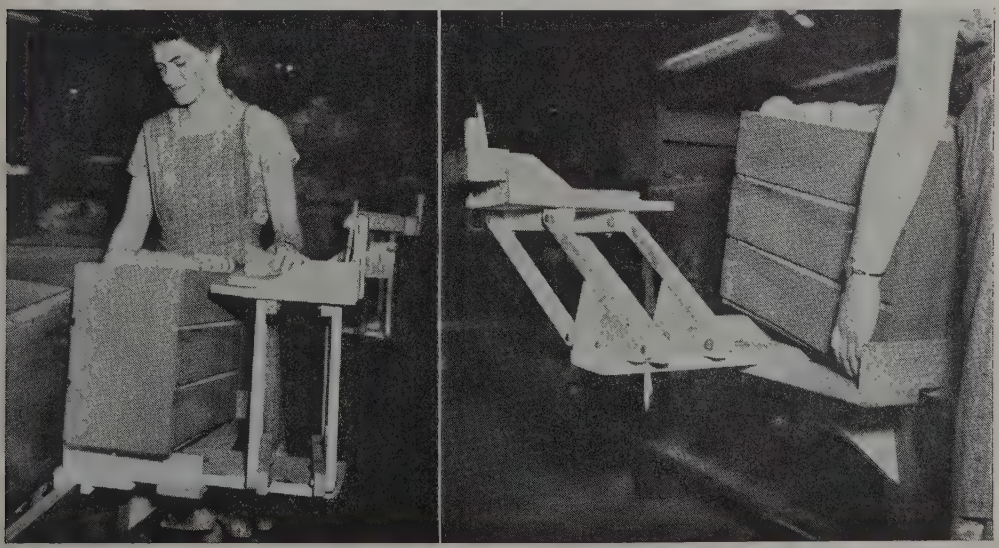


Fig. 13.—A collapsible paper holder, shown here in two positions, facilitates the transference of the packed cases to the rollers

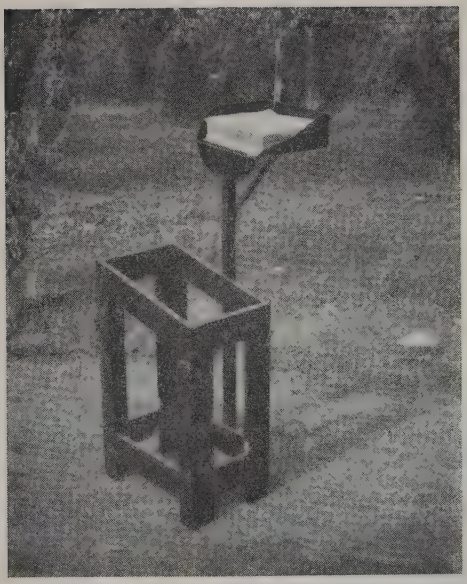


Fig. 14.—A portable packing stand with metal paper holder attached, is an ideal combination

being handled in order to be able to turn out a firmly packed case of the correct height. Where the orchardist is handling his own crop, much valuable time can be lost if he cannot determine quickly the right pack to be used. Once this basic information is obtained, then speed and ease of handling should follow with practice.

PACKING CHARTS

The packing chart is designed to help the grower to decide the pack to be used. These charts, a series of which are included at the end of this publication, have been compiled as the result of extensive experience of packing the various types of fruits and contain all the necessary details needed for producing a satisfactory pack. In the case of apples, considerable variation occurs in the shape of different varieties and a number of charts for apples are therefore included.

It will be seen that all the charts are based on a standard pattern, and refer mainly to the bushel dump case which is the one chiefly used in this State. For certain fruits the $\frac{3}{4}$-bushel case is used for local marketing and the $\frac{1}{2}$-bushel dump for export and charts for these cases are included. In the left hand column of the chart is shown the fruit size which is expressed as the diameter of the fruit measured from cheek to cheek. These sizes run in $\frac{1}{8}$in. increments from the smallest size, that is, $1\frac{5}{8}$in. for plums, to 4in. for grapefruit. This means that a line of $2\frac{1}{2}$in. fruit will contain a range of sizes from $2\frac{1}{2}$in. to less than $2\frac{5}{8}$in.

For export purposes, apples are marked in $\frac{1}{4}$in. sizes. However, it is better for the packer to think in terms of $\frac{1}{8}$in. variations and use the terms $2\frac{3}{8}$in. rather than a large $2\frac{1}{2}$in. or $2\frac{3}{8}$in. instead of a large $2\frac{1}{4}$in.

The pack refers to the relative position of the fruits in the layer. The main packs used in dump and half dump cases are the 3-2 and 2-2, but it will be noted that some charts include 3-3 for small sizes and 2-1 for large sizes.

The system of placement is illustrated in the photographs accompanying the charts from which it will be seen that the 3-2 pack consists of a group of three fruits, placed laterally across the case followed by two fitted into the spaces between them. Groups of three and two fruits are then repeated until the layer is complete. The

Fig. 15.—A close-up of the paper holder showing the weighted needle

Fig. 18.—WRAPPING APPLES. It should be emphasized that the wrapping takes the place of one continuous movement and not a series of separate operations. (1) The packer picks up the apple in one hand and the wrapping paper is simultaneously picked up in the other hand. (2) The apple is thrown into the center of the wrap with the calyx of the fruit adjacent to the middle finger. (3) Without altering the position of the fruit, the paper is folded up with the free hand and held in position (4) while the fruit is twisted. (5) At the same time the hands are turned in opposite directions so that the ends of the wrap form the part on the cheek of the fruit. (6) With the finger still on the calyx to position the fruit (7) the apple is correctly placed in the case (8) while the other hand selects the next fruit to be wrapped

Fig. 17.—A suitable nailing press for a commercial packing shed. Packed cases converging from either direction are passed through the machine to the dispatch rollers after nailing

system of other packs is exactly the same except that the numbers of fruits in the groups vary. Apart from deciding the actual pack, it is also necessary to determine whether a straight or diagonal pack is to be used. These terms refer to the position of the core line of the fruit in relation to the case. Thus in a straight pack, the axis of the fruit is parallel with the sides of the case, while in a diagonal pack the axis run diagonally across the case. Diagonal packs are used for all apples packed in the bushel dump case and for some varieties of plums in the half bushel dump. Straight packs are used for all citrus fruits, pears, many varieties of plums and also apples packed in the standard case. It is usual practice in diagonal packs to face the eyes of fruit in the outside rows outwards and those of inside rows towards the centre.

The layer count indicates the number of fruits in succescsive rows running lengthwise in the foundation layer. Thus a 3-2 pack 5 x 5 layer will have five rows of five, or 25 fruits in each layer. On the other hand a 2-2 pack 5 x 5 layer will have four rows of five or 20 fruits per layer. In the second layer, the fruit is placed in the pockets formed by the previous layer, and this system is repeated until the required number of layers is obtained. No fruit should be placed directly above a fruit in the previous layer but must rest in the pockets formed by the layer underneath.

The number of layers per case will vary according to the size of the fruit and the type of case being used. Thus in the dump case, whereas small sizes may require eight layers to bring the fruit up to the correct height, large sizes of the same fruit will attain the correct height in five layers.

The total number of fruits per case for each pack is known as the count. The count gives an indication of the relative size of the fruit and in the case of citrus fruits is marked on the cases for this purpose. Apples and pears, however, are marked with the size, although in "standard" cases the count is preferable.

PACKING

Variability in the size of the case can cause considerable trouble to the packer and therefore before an adjustment is made to the sizer to overcome packing difficulties, case sizes should be checked, to ensure that this is not the cause. The main variation is in the width, and many packing sheds have installed small saw benches to cut end boards to uniform size just before using. However, where this is not done the packer should keep a close

Fig. 18.—For the smaller shed, roller conveyors both before and after the press are a great advantage

watch on case widths and vary the size of fruit packed accordingly. By careful selection of the fruit it is possible from the one bin to successfully pack cases varying in width by up to a quarter of an inch.

The shape of the fruit, irrespective of the variety, has a considerable influence on the pack and therefore, particularly in the case of apples, packing charts have been prepared more on the basis of fruit shape than according to variety. For instance, Cleopatras, which are usually a long type fruit, can in some districts and in some seasons be packed as a medium long fruit, the same as Granny Smiths. It is therefore misleading to speak of the "Granny Smith Chart" or the "Cleopatra Chart," just as it is wrong to think that a certain variety can always be packed to the same chart irrespective of the type of fruit involved.

In the Granny Smith variety, different sizes may exhibit different characteristics. Larger sizes are normally of the medium long type and conical in shape, whereas the smaller sizes are definitely more round. This can cause difficulty in packing the 2⅝in. size, which may contain a mixture of the two types. By making two packs for this size, namely, a 2-2, 6 x 5 pack for the smaller and rounder 2⅝in. and a 2-2, 5 x 5 pack for the larger or longer shaped fruit, the difficulty can usually be overcome. In the latter pack a few fruits from the 2¾in. bin may be necessary to bring the fruit up to the correct height. In practice in commercial sheds where 2⅝in. fruit predominates in a line it is usual to separate this size into two bins.

With oranges it is generally found that Navels are rather flatter than Valencias and to maintain a standard count some adjustment to the sizing machine is necessary. Navels are usually decidedly larger than Valencias and when changing from one variety to the other the machine should be altered to give a better distribution of fruit throughout the bins.

The 2-2 pack for small sizes, that is, 2½in. or smaller in any fruit packed in the dump case is always unsatisfactory. Some side slackness is inevitable, while with apples the small pockets formed by this pack are likely to cause extensive bruising. Therefore, for all sizes, 2½in. or smaller 3-2

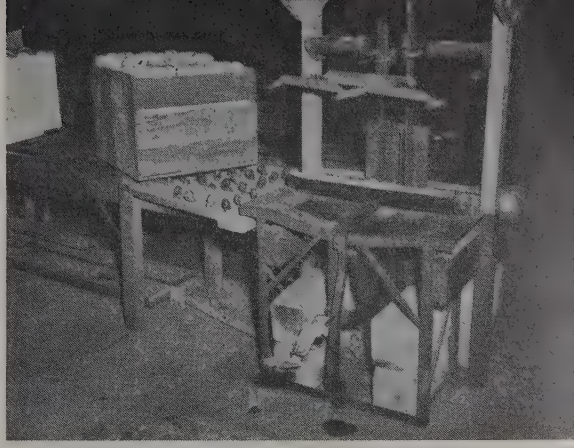


Fig. 19.—On the mixed orchard, a double-sided press fitted on one side with a double arm to handle ¾ bushel flats, and standard equipment for the dump case on the other side, will enable both types of cases to be handled at the one time. Inverted castors assist manoeuvrability

packs should be used. This applies equally to oranges. For instance the 200 count using the 3-2 pack is much preferred to the 196 count packed 2-2.

Standard packs should be maintained at all times. If packs are not coming to the correct height, the size of the fruit packed should be varied, not the pack. Should a variation in the selection of sizes not be sufficient, then a slight alteration to the machine should be made. Non-standard packs are usually unsatisfactory and waste much time.

To maintain good packouts it is essential that packers have good supplies of fruit at all times. Considerable time can be lost where there is insufficient spread of the fruit along the machine. It is particularly important that packers in commercial sheds be enabled to obtain a good morning tally as in practice it is usually found that a poor morning output is followed by a low afternoon tally. A cull belt fitted within easy reach of the packers will also reduce time wasted in disposing of reject fruit and at the same time minimise damage to the fruit.

It is immaterial which way the packer stands in relation to the bins. Some stand with the left side to the bin, others prefer the reverse. Actually the position depends upon convenience. The fruit should be picked up with one hand and placed in the case with the other, so that if the

Fig. 20.—A well-designed label properly attached will assist in producing a favourable impression on the buyers

fruit is to be picked up in the left hand, then the packer must stand with the left side to the bin. It is of the utmost importance to use both hands equally to give a physical balance, and conserve energy, if speed and a good output are to be achieved. When first learning, a packer should therefore decide upon the most comfortable position, as future success depends largely upon reducing wasted energy and time to a minimum.

Except when packing citrus fruits, corrugated cardboard liners should be used wherever possible as a protection against bruising. Paper linings, especially in dump cases, do not protect the fruit and under these conditions much bruising occurs. The cardboards should be placed with the smooth surface against the fruit. The side cardboards are often a little narrow and should, therefore, be pulled up after the first layer is completed, to ensure that the top layer of fruit will also be protected.

Various types of packing stands are in use and although they vary slightly in design the main features are the same, namely, firm construction, yet readily moveable along the bins. Where the fruit is to be wrapped the paper holder should be a permanent fixture to the stand and horizontally placed at a slightly higher level than the top of the case. The height of the packing stand and the holder should be such as to allow the packer to take up a comfortable position to avoid unnecessary fatigue, and they can with advantage be made adjustable.

In the large apple packing sheds it is the practice for packers to mark the size on the case with white chalk, using the following code:—

A single stroke (1) for 2¼in.

Two strokes (11) for 2½in.

Three strokes (111) for 2¾in.

A figure three (3) for 3in.

These marks should be kept small and as neat as possible to prevent disfiguring the cases. One large packing shed has developed a system of letters to indicate sizes which seems satisfactory. For export fruit, which requires labelling, it is a good idea for the size to be stamped on the labels by the packers, using stamps conveniently placed either on the packing stand or on counter-balanced pulleys suspended above the bins. In small sheds it is easier to stamp the size on the case before packing.

Fig. 21. A wiring stand attached to rollers can prove very useful

WRAPPING

Most fruit packed for the local market is forwarded unwrapped but for export lines, other than plums, and certain varieties of apples and pears kept for long storage, wrapping is necessary. Sulphite tissue wraps are used for the majority of fruits, but due to the susceptibility of the Granny Smith to superficial scald, oiled wraps are essential for this variety. Wrapping is desirable for a number of reasons. The packed case is improved in appearance, shrivelling is reduced, while each fruit is isolated from its neighbours and helps to minimise the spread of the various moulds. From the point of view of protection, wraps also play an important part. The pads formed by the tails of the wrapping paper give protection against bruising and during the nailing down operation collectively give a cushion effect to the pack. The green oiled wraps used for Granny Smiths give an attractive appearance to the finished case and coloured wraps similar to the colour of the fruit enhance the presentation of citrus fruits. Printed wraps can also prove very effective.

The size of the wrapping paper should vary with the size of the fruit. Only fruit 3in. and over should be wrapped in 11in. paper. For sizes smaller than 2½in., 9in. paper should be used. This means that the majority of sizes require 10in. wraps.

A convenient type of paper holder is illustrated in this article. The paper is held in position by a weighted needle, which while holding the papers in position allows single wraps to be torn away quickly. This operation is made easier by the use of a finger stall on the middle finger and also by placing the paper so that it tears with the grain rather than across it. The paper should always be used with the polished side outwards.

The wrapping operation is illustrated in the accompanying photographs. Both hands should be used equally throughout the operation. Thus, while one hand picks up the fruit the other takes off the wrapping paper. Having thrown the fruit into the centre of the paper with the eye facing away from the packer, the partly covered fruit is drawn through the hand and finally twisted so that the tail forms a pad on the cheek of the fruit. The fruit is placed in the case with the hand that picks up the paper whilst the other is ready to sort out the next fruit.

Fig. 22.—Tapered wooden rollers with an iron frame on a welded support are quite effective

A person learning to wrap fruit must be taught the correct method, as bad habits once developed are extremely hard to correct and wrapping can become most laborious unless all unnecessary movements are eliminated. Good packing calls for speed, neatness and careful handling of the fruit and time spent in learning properly will more than compensate the packer. Normally the learner packer requires a season's work to become conversant with the various types of fruit to be handled.

CONVEYORS

Roller conveyors should play an important part in any packing shed. A permanent arrangement is necessary to convey the packed cases from the packers to the nailing down press. They should be of a convenient distance from the packer and a suitable height to allow transference of the packed case from the packing stand to the rollers with a minimum of effort. Rollers can also be effectively used when unloading or loading fruit. Metal rollers are most common but suitably constructed wooden rollers are also satisfactory and construction costs are much less. Where rollers are not available a wooden stand will be of some benefit as it obviates the necessity of placing packed cases on the floor and lifting them up again.

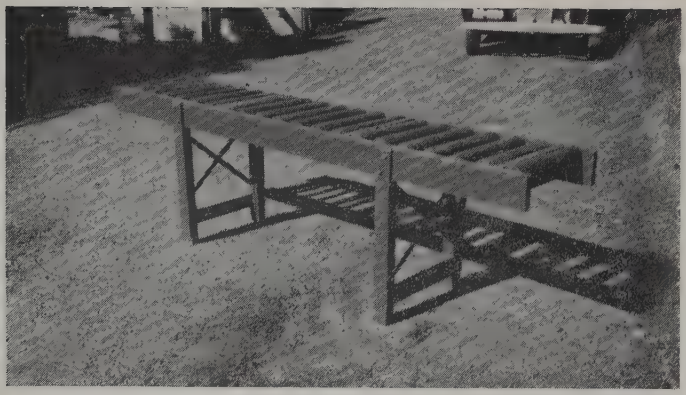


Fig. 23.—This set of portable wooden rollers was constructed by an orchardist

NAILING DOWN AND WIRING

The dump case derived its name from the old method of lidding in which the case was placed on the floor with one end raised on a board and gently dumped to settle the fruit before lidding.

Nailing presses are now extensively used and have become an essential part of packing shed equipment. Most are constructed to handle the dump case, but by slight modification they can be made to accommodate all other types of cases.

Apart from doing a quicker and more efficient job the nailing press helps to conserve shed space by enabling cases to be lidded as they come over the rollers to be stacked.

Considerable bruising can occur in the lidding operation, particularly with apples where high loose packs are being used. A correctly packed dump case of apples should be not more than 1in. above the top of the case when pressed firmly by hand. Provided the fruit is packed in this way and care is exercised to see that the end fruits are almost flush with the end boards then no bruising should occur in the press. An occasional check should be made to see that bruising is not occurring. Where high packs are necessary, for instance, for oranges, which have not been sweated prior to packing, the sides of the case should be slightly spread by hand so that when pressure is applied the fruit will go down without being damaged by the side boards. In the standard apple and pear boxes the lid is sufficiently thin to ensure that little pressure is applied to the fruit during lidding. A large bulge is a feature of these packs.

The wiring of export fruit is advisable to minimise damage to cases in transit. In the larger sheds it is common practice to wire the cases coming from the nailing press before being stacked. The wires give added support to the nails and therefore should be placed approximately one inch from each end of the case, that is, just inside the end boards. Poor wiring not only detracts from the appearance, but often enables the wires to slip off.

Both nailing down and wiring are specialised operations and some excellent tallies have been recorded.

LABELLING AND STENCILLING

An attractive label gives a good finish to a well packed case of fruit and will produce a favourable reaction amongst buyers. Labelling is now used extensively for export fruit and although good stencilling is effective, it does not show to advantage on the red wood cases, which identify Western Australian fruit. Labels must be firmly attached and not likely to lift during transit. Poor labelling can prove a reflection on the contents. For best results, labels should be thoroughly soaked just prior to use and applied with an approved adhesive. By smoothing with a damp cloth, working from the centre of the label, all air bubbles and creases are worked out. Labels should be allowed to dry sufficiently before the cases are packed. Details of variety, size, grade, etc., are best applied by means of rubber stamps with sponge rubber backings.

Stencils are used for all local market fruit. It is necessary that the information on the case should comply with the requirements of marketing regulations. It is much

simpler to use as complete a stencil as possible, rather than a series giving individual detail.

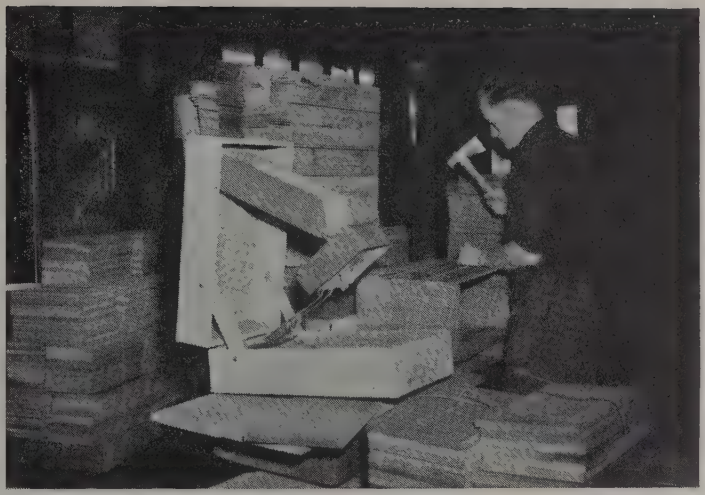


Fig. 24.—A convenient setup makes for greater speed and efficiency in casemaking

CASE MAKING

Case-making machines have come into general use in the large packing sheds in recent years. The latest automatic machines not only completely make the box, but may be adjusted to construct various types of boxes. Nevertheless a large proportion of fruit cases used are still hand-made. Greater speed and efficiency will be attained in hand making with a satisfactory setup. This includes convenient placement of case timber, good lighting, a nail stripper and a solid bench.

When making dump cases, spaces between side boards should not be excessive or damage to the fruit will result. The top board must be level with the top of the case, but the bottom board of a three piece side may be moved up if necessary to reduce these spaces.

MECHANICAL HANDLING

The value of mechanical handling of fruit both in the packing shed and cool store has been demonstrated in many parts of the world in recent years. The use of fork lift motor-driven trucks has revolutionised the rapid movement of stocks of fruit and many modern plants are incorporating this method of handling in the general design of the packing shed and cool store.

Fig. 25.—Apples for local marketing being effectively moved on pallets by a hand-operated hydraulic trolley. In this case, the trolley is being used for transferring the fruit into a private cool store

As yet, little has been done in this regard in this State, although some of the larger packing sheds could benefit from improved handling methods. However, greater use could be made of smaller equip-

ment such as hand-operated hydraulic lift trolleys to reduce the amount of individual case handling.

CONCLUSIONS

The presentation of the fruit is the final phase of the year's work for the grower and one which can greatly influence his return. The quality of the fruit, the equipment available to handle it and the skill in managing packing shed operations, will largely determine the final result. A demonstration of the success of the grower is the buyer's demand for his product. The name of the good grower by virtue of the security it provides to the purchaser creates a demand for his fruit. The successful orchardist is known by the article he markets.

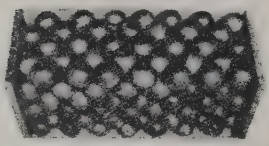
I should like to acknowledge the helpful co-operation of the commercial packing sheds and private growers in making equipment available for illustrative purposes, and the Government Photographer, Mr. Craig Balmer, for the photographic work included in this article.

DEPARTMENT OF AGRICULTURE, WESTERN AUSTRALIA

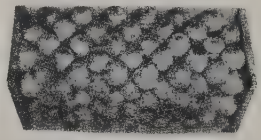
CHART FOR PACKING PLUMS

HALF DUMP CASE

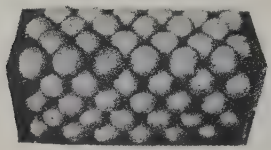
Internal Dimensions—Length 18 ins., Width 7¼ ins. Depth 8¼ ins.



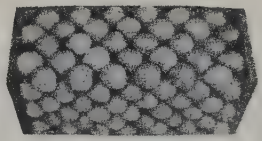
1⅞ in. Santa Rosa A 3-2 pack in 6 Layers Straight Pack



2 in. Satsuma A 3-2 pack in 6 Layers Straight Pack



2⅛ in. Narrabeen A 2-2 pack in 5 Layers Diagonal Pack



1⅞ in Wickson A 3-2 pack in 6 Layers Straight Pack

SANTA ROSA

Approx Size	Pack	Layer	No. of Layers	Count
1⅝	3-3	8x7	7	315
1¾	3-2	7x7	7	245
1⅞	3-2	7x7	6	210
2	3-2	6x6	6	180
2⅛	2-2	8x8	5	160

SATSUMA

Approx Size	Pack	Layer	No. of Layers	Count
1⅝	3-3	8x8	7	336
1¾	3-2	8x7	7	263
1⅞	3-2	8x7	6	225
2	3-2	7x6	6	195
2⅛	2-2	8x8	5	160

NARRABEEN

1⅞	3-2	8x7	6	225
2	3-2	7x6	6	195
2⅛	2-2	8x8	5	160
2¼	2-2	7x7	5	140
2⅜	2-2	6x6	5	120
2½	2-2	5x5	5	100
2⅝	2-1	7x7	4	84

WICKSON

1¾	3-2	7x6	7	228
1⅞	3-2	7x6	6	195
2	3-2	6x6	6	180
2⅛	2-2	8x7	5	150
2¼	2-2	7x6	5	130
2⅜	2-2	6x5	5	110

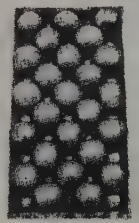
J. S. BLOOMFIELD, Packing Instructor

DEPARTMENT OF AGRICULTURE, WESTERN AUSTRALIA

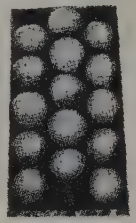
CHART FOR PACKING ORANGES

DUMP CASE

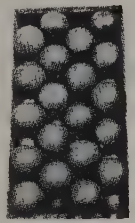
Internal Dimensions — Length 18 ins., Width 8¼ ins., Depth 14¼ ins.



The 3-2 pack for the 200 count and smaller



The 2-1 pack for the 75 count and larger



The 2-2 pack for the 84 to 182 count

Approx. Size	Pack	Layer	No. of Layers	Count	Remarks
2	3-2	7 x 6	9	293	A 7 x 7 layer pack of 315 count can be used for slightly smaller oranges
2⅛	3-2	6 x 6	9	270	
2¼	3-2	6 x 5	9	248	
2⅜	3-2	5 x 5	9	225	Select largest oranges for foundation layer
2½	3-2	5 x 5	8	200	
2⅝	2-2	7 x 6	7	182	The smallest 2-2 pack, must be packed tightly
2¾	2-2	6 x 6	7	168	
2⅞	2-2	6 x 5	7	154	Some oranges slightly larger than 2¼ in diameter may be required
2¾	2-2	5 x 5	7	140	
2¼	2-2	5 x 4	7	126	
3	2-2	4 x 4	7	112	Pack loosely
3⅛	2-2	4 x 4	6	96	This pack has only 6 layers and must therefore be packed tightly
3¼	2-2	4 x 3	6	84	
3⅜	2-1	5 x 5	5	75	Pack tightly selecting flatter oranges for foundation layer
3½	2-1	5 x 4	5	68	

This chart has been compiled to standardise the packing of ORANGES

The 200 count will be packed from the larger 2⅛ in. fruit while the 225 from the smaller 2⅜. Similarly the 154 count will be packed from the larger 2⅞ and the 168 from the smaller 2¾.

J. S. BLOOMFIELD, Packing Instructor

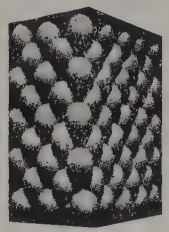
DEPARTMENT OF AGRICULTURE, WESTERN AUSTRALIA

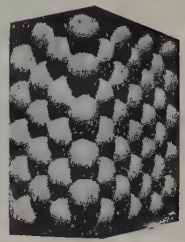
CHART FOR PACKING LEMONS

DUMP CASE

Internal Dimensions—Length 18 ins., Width 8¼ ins., Depth 14¼ ins.

The 203 count a 3-2 pack 5x4 in 9 Layers





The 140 count a 2-2 pack 5x5 in 7 Layers

Approx. Size	Pack	Layer	No. of Layers	Count	Remarks
1⅞	3-2	6 x 6	9	270	Same counts as small oranges
2	3-2	6 x 5	9	248	
2⅛	3-2	5 x 5	9	225	
2¼	3-2	5 x 4	9	203	Select long shaped lemons for foundation layer
2⅜	3-2	5 x 4	8	180	These 3-2 packs in 8 layers are most suitable for long shaped lemons
2½	3-2	4 x 4	8	160	
2⅝	2-2	5 x 5	7	140	Pack tightly the smallest 2-2 pack
2¾	2-2	5 x 4	7	126	Same as medium size orange counts
2⅞	2-2	4 x 4	7	112	
3	2-2	4 x 3	7	98	Select long shaped lemons for foundation layer
3⅛	2-2	3 x 3	7	84	Good pack for long lemons
3¼	2-2	4 x 3	6	84	Use if lemons are round

This chart has been compiled to standardise the packing of LEMONS.

Due to the shape of lemons it is necessary for the more desirable export sizes to have one more layer than for oranges.

To obtain a satisfactory height the 203 count in 9 layers is preferred to the 200 count in 8 layers.

Again a more satisfactory pack is obtained by packing the 2¼ and 2½ in. sizes a 3-2 pack in 8 layers than in a 2-2 pack in 7 layers.

In lemons the 140 count is the smallest size utilising the 2-2 pack. With the many shapes of lemons in the different seasons some adjustment to the sizing machine may be necessary to the approximate sizes given in this chart.

J. S. BLOOMFIELD, Packing Instructor.

DEPARTMENT OF AGRICULTURE, WESTERN AUSTRALIA.

CHART FOR PACKING APPLES

AUSTRALIAN APPLE-BOX (DUMP)

Internal Dimensions—Length 18ins., Width 8⅞ins., Depth 14¼ins.

ROUND TYPE—Jonathan.

Approx. Size.	Pack.	Layer.	No. of Layers.	Count.	Remarks.
2⅛	3–2	7 x 6	8	260	Pack firmly.
2¼	3–2	6 x 6	8	240	Contains smallest possible 2¼ apples.
2⅜	3–2	6 x 6	7	210	Pack tightly.
2⅜	3–2	6 x 5	7	193	For larger 2⅜ apples or slightly longer fruit.
2½	3–2	5 x 5	7	175	A SHOW pack, the only pack for the round 2½ apple.
2⅝	3–2	5 x 4	7	158	Pack loosely, or alternatively a 2–2 7 x 6 in 6 layers tightly.
2¾	2–2	6 x 6	6	144	For smallest 2¾ apples.
2¾	2–2	6 x 5	6	132	A good pack for a line of large apples.
2⅞	2–2	5 x 5	6	120	Cases of larger sized Jonathans should contain approx. 43lb. when packed.
3	2–2	5 x 4	6	108	

J. S. BLOOMFIELD, Packing Instructor.

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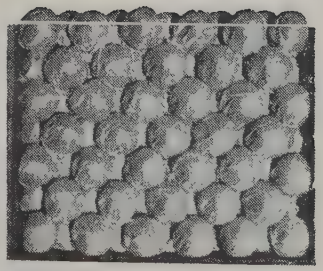
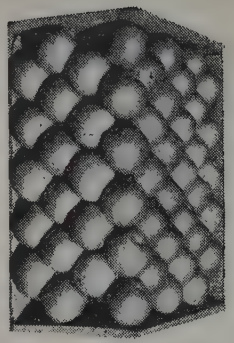


THE CORRECT HEIGHT ABOVE THE TOP OF THE CASE BEFORE LIDDING IS ONE INCH FOR THE 3–2 PACK AND ¾ OF AN INCH FOR THE 2–2 PACK.

LONG TYPE—Cleopatra.

Approx. Size.	Pack.	Layer.	No. of Layers.	Count.	Remarks.
2¼	3–2	5 x 5	8	200	Shorter apples could be packed, a 220 count.
2⅜	3–2	5 x 4	8	180	For extra long apples.
2⅜	3–2	5 x 5	7	175	A good firm pack.
2½	3–2	5 x 4	7	158	The only pack for the long 2½ apple.
2⅝	2–2	5 x 5	7	140	Pack loosely on the flat cheek of the apple.
2¾	2–2	5 x 4	7	126	A 6 x 5 in 6 layers could be used if necessary.
2⅞	2–2	5 x 4	6	108	A firm pack.
3	2–2	4 x 4	6	96	Contains the largest 3 in. apples.
3¼	2–2	4 x 3	6	84	A loose pack.

Cleos. vary in length in different districts. Some medium-long packs could be used as alternatives.

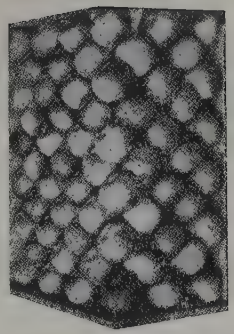


A 2¾ G.S. 2-2 PACK IN 6 LAYERS.

MEDIUM-LONG—Granny Smith.

Approx. Size.	Pack.	Layer.	No. of Layers.	Count.	Remarks.
2¼	3-2	6 x 5	8	220	A 240 count could be packed with round fruit.
2⅜	3-2	5 x 5	8	200	Pack loosely.
2½	3-2	5 x 5	7	175	The only pack for the 2½ G.S.
2⅝	3-2	5 x 4	7	158	Pack loosely.
2⅝	2-2	6 x 5	7	154	This and the 140 count could be used with long apples.
2¾	2-2	6 x 5	6	132	Good firm packs.
2⅞	2-2	5 x 5	6	120	
3	2-2	5 x 4	6	108	
3⅛	2-2	4 x 4	6	96	Contains the largest 3 in. apples.
3¼	2-1	6 x 5	5	83	Pack tightly.
3½	2-1	5 x 5	5	75	

2½ and smaller Granny Smiths tend to be round, whereas the larger sizes are more conical.



A 2½ YATES 3-2 PACK IN 7 LAYERS.

FLAT TYPE—Dunns, Yates.

Approx. Size.	Pack.	Layer.	No. of Layers.	Count.	Remarks.
2⅛	3-2	7 x 7	8	280	A 3-3 pack of 288 apples could be used if necessary.
2¼	3-2	7 x 6	8	260	Contains the smallest 2¼ apples.
2⅜	3-2	7 x 6	7	228	A good solid pack.
2½	3-2	6 x 5	7	193	The only pack for the 2½ flat apple.
2⅝	3-2	5 x 5	7	175	An easy pack for the 2⅝, or a 2-2 7 x 7 in 6 layers 168 apples.
2¾	2-2	7 x 6	6	156	For the smallest 2¾. Good pack for Yates.
2¾	2-2	6 x 6	6	144	Good packs for Dunns.
2⅞	2-2	6 x 5	6	132	
3	2-2	5 x 5	6	120	
3⅛	2-2	5 x 4	6	108	Contains the largest apples under 3¼.
3¼	2-1	7 x 6	5	98	A solid pack for Dunns.

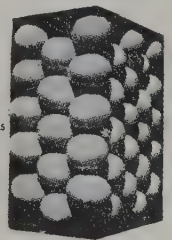
The sizing of flat fruit is difficult. Extra attention to sizing by the packers is necessary, especially in the smaller bins. Use 9 x 9 wrapping paper on small apples.

DEPARTMENT OF AGRICULTURE. WESTERN AUSTRALIA

CHART FOR PACKING GRAPEFRUIT

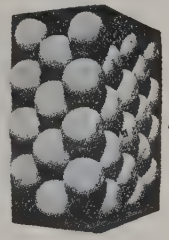
DUMP CASE

Internal Dimensions—Length 18 ins., Width 8¼ ins., Depth 11¼ ins.



The 75 count
A 2-1 pack 5x5
in 5 Layers

Cheeks to the Side of Case



The 80 count
A 2-1 pack 4x4
in 5 Layers

Stylar End to Side of Case

Approx. Size	Pack	Layer	No. of Layers	Count	Remarks
3	2-2	5 x 4	7	126	Pack with cheeks to side of case
3¼	2-2	4 x 4	7	112	Pack with stylar end to side of case
3⅜	2-2	4 x 4	6	96	Pack with stylar end to side of case
3½	2-1	6 x 5	5	83	Pack with cheeks to side of case
3⅝	2-1	5 x 5	5	75	Pack with cheeks to side of case
3¾	2-1	5 x 4	5	68	Pack with cheeks to side of case
3⅞	2-1	4 x 4	5	60	Pack with stylar end to side of case
4	2-1	4 x 3	5	53	Pack with stylar end to side of case
4¼	2-1	3 x 3	5	45	Pack with stylar end to side of case
4½	2-1	3 x 2	5	38	Pack with stylar end to side of case

This chart has been compiled to standardise the packing of GRAPEFRUIT.

The Remarks Column explains the correct placing of the fruit as shown in the illustrations.

Grapefruit must be packed very firmly because of the shrinkage of the thick skins during storage.

The presentation of the 3¼ in. fruit is better when packed a 2-1 pack in 5 layers an 83 count than the loose 2-2 pack in 6 layers an 84 count.

In the larger sizes a suitable pack can be maintained by sizing to a ¼ of an inch.

With irregular shaped fruit some variation may be necessary to the approximate sizes shown on the chart.

J. S. BLOOMFIELD. Packing Instructor.

DEPARTMENT OF AGRICULTURE. WESTERN AUSTRALIA

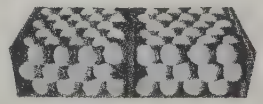
CHART FOR PACKING CITRUS

¾ BUSHEL CASE

Internal Dimensions—Length 24 ins., Width 6 ins., Depth 12 ins., clear of division

LEMONS

The 144 count
A 2-1 pack 4x4
in 6 Layers



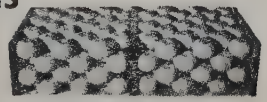
Approx. Size	Pack	Layer	No. of Layers	Count	Remarks
2	2-2	4 x 3	8	224	The smallest 2in. suitable for round fruit
2	2-2	3 x 3	8	192	
2⅛	2-1	4 x 4	7	168	Select largest sizes for foundation layer
2¼	2-1	4 x 4	6	144	Pack tightly
2⅜	2-1	4 x 3	6	126	
2½	2-1	3 x 3	6	108	
2⅝	2-1	3 x 2	6	90	The largest pack with suitable presentation

THE ¾BUSHEL CASE IS A SUITABLE CASE FOR PACKING LEMONS FOR THE LOCAL MARKET

LARGE SIZE LEMONS ARE BETTER MARKETED IN DUMP CASES

MANDARINS

The 168 count
A 2-2 pack 3x3
in 7 Layers



Approx. Size	Pack	Layer	No. of Layers	Count	Remarks
2	3-2	4 x 4	8	320	For fruit smaller than 2in. the 3-3 pack is more suitable
2	3-2	4 x 3	8	280	Could contain some 2¼in. fruit
2⅛	3-2	4 x 3	7	246	Pack tightly
2¼	2-2	4 x 4	7	224	
2⅜	2-2	4 x 3	7	196	
2½	2-2	3 x 3	7	168	Pack loosely selecting largest fruit for the foundation layer
2⅝	2-2	3 x 3	6	144	Pack tightly
2¾	2-1	4 x 3	6	126	
2⅞	2-1	3 x 3	6	108	3in. fruit can be packed 2-1, 3 x 2 in 6 layers, a 90 count

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J. S. BLOOMFIELD Packing Instructor.

ADDITIONS TO THIS SERIES.—Charts for packing pears in both ¾-bushel and half-dump cases are now in preparation and it is hoped that they will be available for distribution before the next packing season. Other charts in preparation show the method of packing mandarins in half-dump cases, and a revision is being made of the packs for tomatoes in ¾-bushel and half-dump cases.

WATER HYACINTH

[*Eichornia crassipes* Solms.]

Although Water Hyacinth is not a weed of crops or pastures, it is of considerable significance to agriculture. Irrigation channels have been blocked and waterways rendered useless by dense infestations. It occurs naturally in tropical and sub-tropical America, but has become established in many other countries including some with temporate climates

WEEDS of Western Australia

By **G.R.W. MEADLY** M. Sc.
Officer in Charge, Weeds and Seeds Branch

WATER HYACINTH

(Eichornia crassipes Solms)

THE story of Water Hyacinth is similar in many countries. It occurs naturally in sub-tropical and tropical America, in Venezuela being called "Ear of a Mule" or "Little Boat." Plants were first introduced to the United States of America in 1884, and excited great admiration. Many visitors to the Floral Exposition in New Orleans carried away plants to their gardens and pools. Surplus material was thrown into creeks and within a short period Water Hyacinth was carried through the waterways of Florida. To quote Dr. P. W. Zimmerman—"The rapid spread of Water Hyacinth in the Southern States, with its adverse effects on agriculture, health and wild life and its interference with drainage and navigation has been an alarming problem for many years."

Water Hyacinth now occurs very extensively on Indian waterways and has also been recorded in pest form from a number of other tropical and sub-tropical countries including Africa. It is not restricted to such conditions, however, as shown by Australian experience. An early report states that the first Water Hyacinth on the Northern Rivers of New South Wales was purchased from a nurseryman at Brisbane by a local resident who subsequently threw some plants into the Swan Creek at South Grafton. Another reference mentions that in 1899 a couple of small, wilted insignificant-looking plants were procured from a home in a Sydney suburb and placed in Swan Creek on the Clarence River. Within a few years the hyacinth had taken complete possession of numerous creeks and lagoons associated with the Clarence and Richmond Rivers. In 1906 the New South Wales Parliament appointed a commission to inspect the areas affected by Water Hyacinth on the Northern Rivers and make recommendations in the matter.

In the Spring of 1937 a resident of a fruit-growing settlement on the River Murray in South Australia, being impressed by the beauty of Water Hyacinth which had multiplied rapidly in a fish pond at his home, introduced a few plants into Ramco Lagoon with a view to improving the scenery and possibly increasing tourist traffic to the River District. Within eighteen months many acres of the lagoon were covered with a dense mass of the weed which had also spread to other lagoons and to the River Murray itself. Fortunately, as a result of drastic action by the South Australian Department of Agriculture the infestation was eradicated.

The date of introduction of this plant to Western Australia is not known with certainty but in 1929 the only recorded occurrence was at Dog Swamp on the Wanneroo Road. Subsequently Lake Monger became infested and presented the greatest problem while a small area was also located in the Uduc Brook at Harvey.

DESCRIPTION

The common name is self-explanatory. The plant is restricted to water or permanently saturated soils and the flowers bear some resemblance to the garden Hyacinth although not closely related botanically.

The plants normally float on relatively still water, the roots developing to a length of several feet and hanging freely except in shallow water. They are made buoyant by bladder-like swellings of the young leaf stalks. These swellings, largely filled with air, decrease in size as the leaf becomes older. The leaf blades are dark green and rounded with a tendency to curve inwards. The flowering scape is 6 to 12 inches in length with several bracts subtending 6 to 12 delicate pale heliotrope to mauve flowers. Each flower has a curved perianth tube with six segments, the upper one with a prominent yellow marking.

Water Hyacinth propagates rapidly by vegetative means. Stolons radiate from the parent plant and clusters of leaves, along with roots, are soon formed at their extremities. These in turn produce further stolons. The joining links become brittle with age and a mild agitation of the water is sufficient to cause sections to break away. These soon form independent colonies. Under favourable conditions three plants have been reported to produce 3,000 new plants in 50 days.

Propagation by means of seeds also occurs. These sink to the bottom and germination normally takes place on the soil forming the bed of a lake or lagoon. The seedlings soon rise to the surface and make rapid growth.

SIGNIFICANCE

Although Water Hyacinth is not a weed of crops or pastures it has a number of undesirable features, several of which are of significance to agriculture. Important waterways in many countries have been made unfit for navigation thus eliminating an economical form of transport. Irriga-

Water Hyacinth growing on Lake Monger. The plants in the right foreground show the effects of a recent spraying with 2,4-D. The weed has now been eradicated from Lake Monger.

tion systems have been disorganised, not only by reducing the flow in channels but by blocking pipes. Additional screens and filters must be fitted and maintained at no small cost in the case of both irrigation and domestic water. A dense growth of the weed can also affect fish and other wild life.

Pleasure boating with small craft is made impossible and the floating growth could easily contribute to drowning accidents. The decayed material, particularly on the banks of lagoons and lakes is, to say the least, undesirable and the water can become unfit for consumption by human beings or even livestock.

From time to time suggestions have been made concerning possible uses for Water Hyacinth. Utilisation of the potash and nitrogen content for fertilizers has been mentioned along with products such as paper, fodder for cattle and inks. These suggestions have originated mainly from India where, in Bengal Province alone, Water Hyacinth covers some 10,000 square miles.

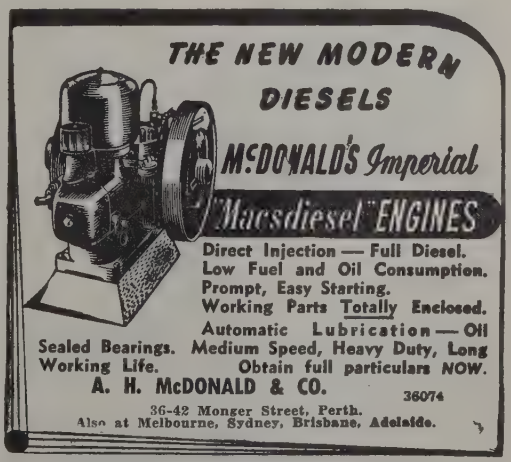
Water Hyacinth has been declared a primary noxious weed for the State.

CONTROL

At the beginning of this century, the United States of America was exploring various control measures. Booms and fences were constructed and dredges with conveyors and mechanical rollers were tried, but no effective method for extensive areas was found. A number of chemicals were also tried with little success and were less satisfactory than the mechanical methods.

On Lake Monger in Western Australia, where an area of 40 acres or more was covered with Water Hyacinth, removing the weed mechanically was not practicable and an effective chemical appeared to give the greatest possibilities of control. The results with a chlorinated benzene were not encouraging and in 1946 the first of a series of trials with hormone-like herbicides was commenced. The weed was killed by various formulations of 2,4-D at the rate of 2 lb. of acid equivalent in 100 gallons of water per acre.

Subsequently it was found that higher rates of chemical were necessary to induce rapid sinking of the plants and also that low-volume treatments were satisfactory. This information paved the way for the use of aircraft for spraying—the only practical method for large infestations growing at a distance from banks. Highly successful results were obtained by the application of 6 to 8 lb. acid equivalent of the amine salt of 2,4-D in two gallons of water per acre. The amine was preferred to the ester because of the risk of damaging cultivated plants in the vicinity of the lake. A Tiger Moth plane fitted with a 30 ft. boom was used. Most of the spraying in this State has been undertaken early in the summer—November and December—but a fast rate of killing and sinking has been obtained in America by treatment during the relatively slow-growing period (August-March). The treatment described has enabled Water Hyacinth to be eradicated from Lake Monger and has given confidence that any further outbreaks can be handled.



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CREAM "TESTS" AND BUTTER QUALITY

By D. C. MICKLE, F.I.D.M., Dairy Instructor

A QUESTION often put to butter factory managers and operatives by the producers is, "What test do you want in cream delivered at the factory?" The word "test" in this case refers to the richness of the cream, or in other words to the percentage of butterfat it contains.

The answer usually given is that the factory prefers cream with a "test" or fat content of 36 per cent. to 40 per cent. in winter and up to 42 per cent. in summer. These percentages are based on important factors. In the first place, cream of the right consistency is needed to ensure a high degree of efficiency in processing and churning, while cream that is too thick or too thin leads to wastage of butterfat or skim milk, difficulty in sampling and testing, inefficient processing and, in the case of thin cream, losses by splashing during transport.

In defining the legal limits, Regulation 45 of the Dairy Industry Act, 1922-1939, gazetted May 4, 1951, reads as follows:—

"Cream delivered at factories during the months of September, October, November, December and January, February and March for the manufacture of butter shall contain not less than 37 per cent. of butterfat, and, during the other months of the year, shall contain not less than 30 per cent. of butterfat."

THE IDEAL TEST

Cream with a butterfat proportion of 36 per cent. to 40 per cent. imposes no hardships on the farmer in his efforts to obtain good keeping qualities.

Provided that the separator is in good working order, the skim milk is separated efficiently from the butterfat.

Where the rate of inflow of milk to the bowl is excessive, there will be thin cream with loss of fat in the skim milk.

Where the separator is adjusted to give too thick a cream there is apt to be loss of fat by clogging up of the bowl, particularly when the temperature of the milk is below the normal range of 90° to 95° F.

Provided it is kept under good conditions and stirred regularly, cream of the consistency advocated ripens evenly. The development of lactic acid in the cream brings about a thickening in consistency which may suggest a higher fat content to the inexperienced person.

Cream graders do not object to a marked lactic acid flavour, which is a normal condition, but the cream must show no indications of staleness in flavour or appearance.

Good first impressions count for a lot. The grader's first impressions of the cream are just as important to the farmer as the buyer's first impressions are to the butter manufacturer.

Attractive appearance is important and is well worth striving for. It is only natural that if one has to taste any substance, the act of tasting is made more pleasurable if the substance has an attractive appearance. The grader has to taste each batch of cream and it is to the farmer's advantage to send in cream which is of good texture and appearance.

WHEN CREAM IS TOO THIN

Apart from the losses from splashing previously referred to, thin cream, because of the excessive quantity of milk that it contains, will curdle or leave a deposit of white curd in the bottom of the can. This is most likely to occur in summer and in cream which has been inadequately stirred. Such cream deteriorates rapidly.

Curdy cream affects the efficiency of sampling and testing and extends the churning time, thus increasing operating costs.

WHEN CREAM IS TOO THICK

A cream which is too thick, by reason of an unduly high "test" or in other words a cream containing too high a percentage of butterfat soon develops a tallowy or oxidised flavour by reason of the fact that there is insufficient milk serum to afford the necessary protection to the fat globules. Where strong "feed flavours" are to be contended with it is decidedly a disadvantage to separate at too high a test.

Acidity in such cream is slow in developing and the cream takes on an insipid, characterless flavour.

The consistency does not permit of easy and adequate stirring so that the cream from various batches does not blend well in the can. Aeration of the cream depends on efficient stirring and a very rich cream is often lumpy and of uneven texture giving it an uninviting appearance.

Thick lumpy cream is difficult to sample effectively. The rich hard lumps, if missed by the sampler or picked up by it, are apt to give incorrect results in testing.

Many farmers would be surprised to learn of the alarming loss of time and degree of inconvenience caused in a factory by the handling of thick cream.

Such cream will not pour freely, in fact it is necessary in many cases to pull the cream from the cans. Time spent on this work upsets the routine of the cream-handling floor and causes serious hold-ups in the processing.

Large quantities of cream adhere to the cans, increasing the wastage figures, and adding to the rinsing time.

The average test for cream received at the factory is between 40 per cent. and 42 per cent. Some dilution takes place when rinsing the cans, in dissolving the neutralising agent and by condensation in direct steam pasteurisation. This dilution brings the test down to 34 per cent. to 36 per cent.

At one time a churning test of about 40 per cent. was advocated but with the use of modern machinery, scientific investigation has revealed an improvement in the texture and flavour of the butter when a lower butterfat percentage was used.

Sometimes more water has to be added to standardise the cream but the addition of water in excess of a certain quantity leads to the production of a flat, characterless butter.

Dairy farmers have every reason to give careful attention to this feature of their activities as a high degree of co-operation between the cream producer and the factory staffs will be reflected in an improvement of the quality of our butter and this will be mutually advantageous.

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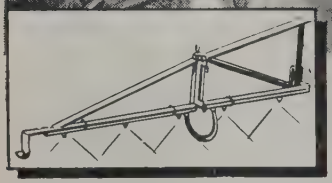

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STATION MANAGEMENT—

THE VALUE OF "DEFERRED GRAZING"

By W. M. NUNN, B.Sc. (Agric.), Officer in Charge, North-West Branch, and H. SUIJDENDORP, B.Sc. (Agric.), Agricultural Adviser.

Fig. 1.—The left-hand plot in this photograph was grazed heavily immediately after rain. It will be seen that the spinifex has had no opportunity of seeding and butts of eaten-down native grasses may be seen among the spinifex tussocks. On the other side of the fence the spinifex has seeded profusely and other grasses are also present.

MOST station people resent any inference that the deterioration in carrying capacity of their country is in any way due to overstocking in past years. A popular, but not very constructive, view is that seasons have become progressively less favourable and that one of these days those soaking summer rains will return and all will be well again.

Work in progress at Abydos and Woodstock Stations in the Port Hedland hinterland is already throwing some light on the rate-of-stocking factor which it seems will have application in most pastoral regions.

Station managers, for the most part, are guided by the appearance and condition of their sheep in deciding paddocking arrangements. The animals are permitted to graze a paddock as long as they continue to do well. The sheep naturally eat out the most palatable species first and then move to those less attractive to them. By the time the animals show signs of fodder shortage and are moved, permanent damage has been done to the more valuable components of the native vegetation.

If stocking is continuous, the most palatable species are kept eaten down all the time. The earliest shoots are nibbled off immediately on their appearance after rain. The plant is not permitted to develop the leafage essential to photosynthesis which would enable it to store reserves in crown and root—neither can it set seed. Under such conditions, species attractive to the grazing animal must be eliminated and their place taken by the unpalatable species which are not worried by the stock and receive additional encouragement as a result of the removal of so much of the former competition.

From work in hand at Abydos it is obvious that this is the way of things, even at low levels of stocking, if the animals are left in the paddocks continuously, and evidence of this type of degeneration can be seen throughout all types of pastoral country.

1. On coastal grassland areas where the majority of species are palatable, soils have been denuded and subjected to wind erosion.

2. In mixed spinifex and grass country, native grasses have disappeared from amongst the spinifex tussocks leaving a stand of pure spinifex.

3. On harder country in the spinifex zone the softer types of spinifex have been replaced by unpalatable types.

4. We have not yet studied the matter at close quarters in mulga areas, but local pastoralists will confirm that the perennial grasses, and a lot of the smaller palatable plants which contributed to stockfeed in the earlier years of settlement, have dis-

Fig. 2.—Visitors inspecting one of the grazing trials at the field day held at Abydos Station, March, 1954. The heavily eaten-down plants in the foreground are of Curly spinifex (Plectrachne Schinzii), one of the most palatable species of the spinifex group. Woolly spinifex (Triodia lanigera) has been untouched, and over most of this area has completely replaced the softer and more palatable types.

appeared and there has been a corresponding increase of inedible shrubs of the turpentine bush type.

In management trials on average spinifex country at Woodstock, stocking rates were unusually high for this class of country. At times they were as high as four sheep per acre, and on a year-round basis they averaged a sheep per two acres. Yet this country has improved over the three years the trial has run, and grasses which have not been observed in the vicinity for over ten years have reappeared and re-established themselves as members of the plant community—permanent members if the right treatment is continued.

The important point is that grazing was deferred following rains for the period necessary (only about eight weeks in this climate) to enable grasses to set seed. During this period the plants were able to develop fully; perennials were able to make leafage and manufacture those reserves in crown and root which make them capable of such ready response after each small precipitation. Consequently the bulk of feed provided by the area was considerably greater than if a smaller number of sheep had been permitted, by feeding continuously, to eat the new shoots as they appeared.

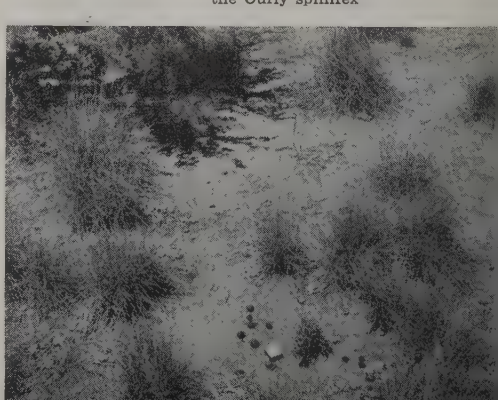
In addition, the larger number of sheep moving over the area immediately after seed formation provided the necessary planting-down operation by trampling seed into the ground instead of leaving it to be eaten by birds, carried away by ants, or to be blown or washed from sunbaked surfaces. These are factors which may account for the relatively small benefits which are apparent in many cases where a paddock is spelled for an entire season.

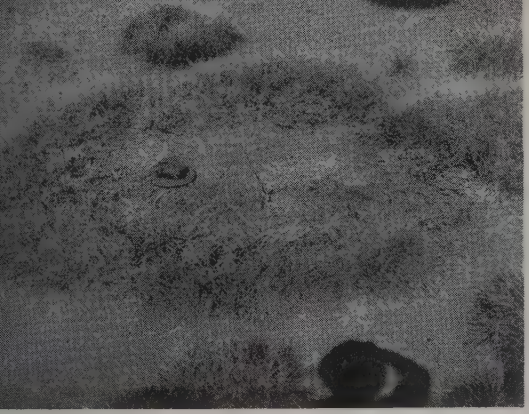
"Deferred grazing" is a term not so far used to any extent in this country. It is not to be confused with rotational grazing where plants may be grazed and spelled several times in a season. It has special application in our pastoral areas and I think may become accepted parlance in future years.

It is obvious that we can't defer grazing in all paddocks at the same time as we would have nowhere to put the sheep. An area can be selected however, for regenerative treatment, and grazing could be deferred after significant rains for two seasons in succession.

If one-third of the property were so treated each year, the whole of the property would benefit over a six-year period. However, there would probably always be local factors which would point to special treatment in certain paddocks. For instance, at Munda, Mr. Lukis is careful to defer his coastal paddocks during the susceptible period each year, because he is well aware of the delicate balance between valuable grasses and spinifex, and of the danger in this country of wind erosion and claypan formation if the grass cover is allowed to weaken.

Fig. 3.—The single plant surrounded by droppings ne the matchbox is Curly spinifex (Plectrachne Schinz and is eaten hard back while Gummy spinifex (Triod pungens) is untouched. The Gummy spinifex, althou a good soft edible type is a less palatable species th the Curly spinifex





ig. 4.—The large circle of growth around the hat is one lant of Woolly spinifex now dying from the centre. t has monopolised this patch of ground to the exclusion of useful species for many years

Illustration No. 1 shows portion of a trial recently started at Abydos in which a small area is stocked continuously at a rate of one sheep per three acres. The area is subdivided into 12 equal paddocks, and the sheep are moved from paddock to paddock according to judgment based on observation as to plant requirements. The paddock on the right shows the wealth of seed formation resulting from a recent rain, while that on the left shows how thoroughly grazing prevented seed formation when stocked during the susceptible period. Note also the small dark butts of perennial grasses amongst the spinifex tussocks. Repeated treatment of this nature would kill these right out, but this paddock will not be asked to stand up to such treatment again for probably six or more years. Grasses are really on the increase in this trial area, and we feel confident that by this system we can carry a sheep to each three acres indefinitely and still improve our country.

Admittedly, there are areas where kangaroo numbers are so great that their grazing exceeds that done by the sheep. However, there are many stations which could effectively apply the deferred grazing system. A few we know are already doing so, and these people must have received a lot of encouragement from the convincing demonstrations at Abydos and Woodstock stations.

Fig. 5.—An interesting snapshot from the spinifex zone. A pair of eagles have built their nest in the only sizeable tree to be found in an area of many miles

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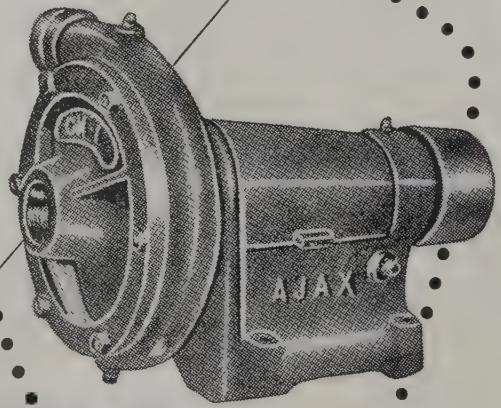

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TREES OF WESTERN AUSTRALIA

By C. A. GARDNER, Government Botanist

No. 29—WOOLLYBUTT
(Eucalyptus miniata A. Cunn ex Schau.)

No. 30—GNAINGAR
(Eucalyptus phoenicea F. Muell.)

THESE two trees differ from all other species of Eucalyptus in that their bark, on the lower portions of the tree where it is persistent, is composed of numerous thin flakes almost like sheets of mica. These plates are traversed by fibres and on the older parts of the trunk, when the flakes have decayed, the fibres are left like a dense netting giving rise to the appearance from which the Woollybutt gets its name.

The name Woollybutt is scarcely appropriate since the fibres are straight and friable and not in the least like wool. The names "Melaleuca gum" or "Cadjeput gum" are no more appropriate because the flakes, although of the consistency of paper, are not like those of the tea tree, and are much more friable. There is some resemblance between the bark of these trees and that of the birch tree but here again the resemblance is not a close one.

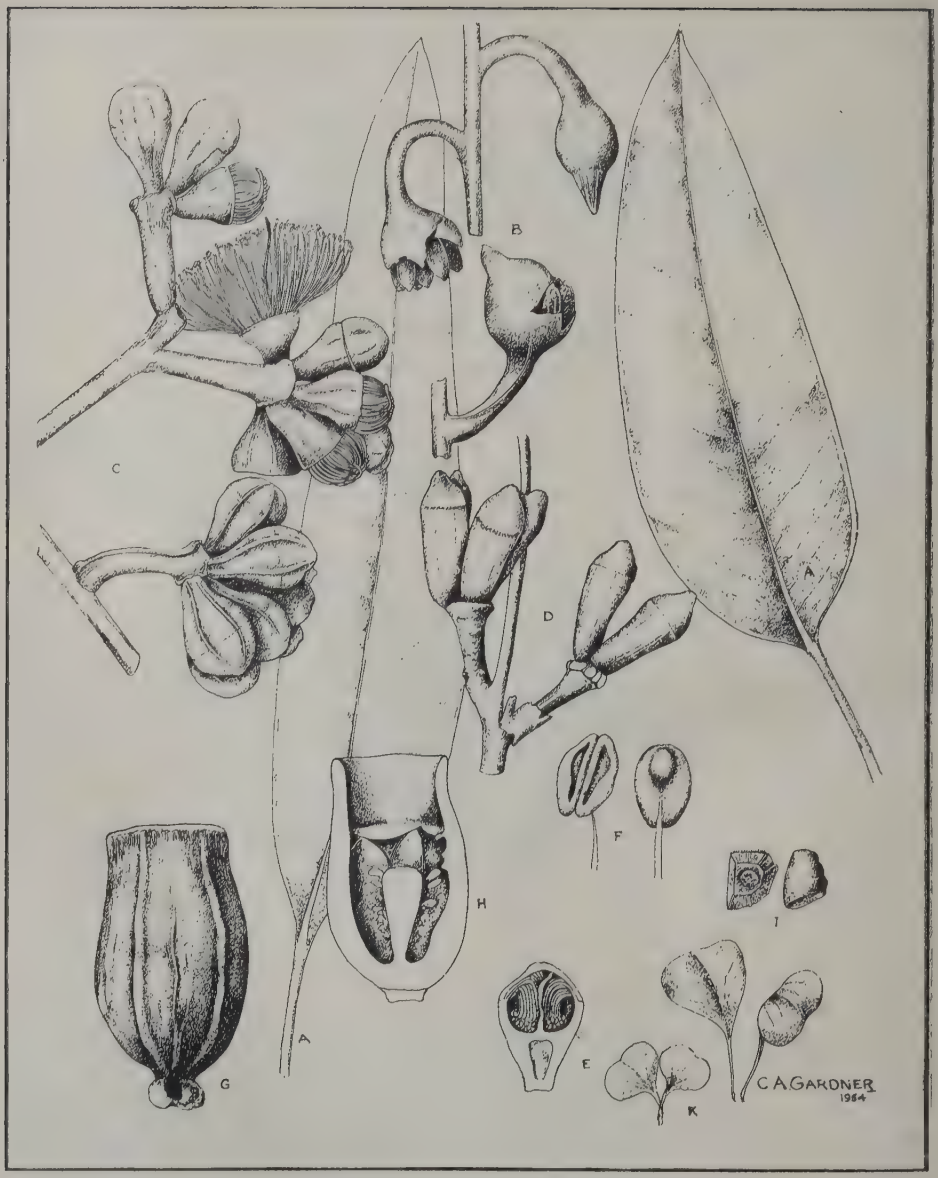
The young flakes are yellow in colour but become reddish-pink with age, and the more persistent fibres are pale brown. The upper part of the trunk and the branches are smooth and yellowish to white in colour and the branchlets are powdery white on the Woollybutt but reddish coloured in the Gnaingar. Both trees have flowers (filaments) of an intense orange-vermilion or sometimes a yellowish-orange, and both have green, not glaucous leaves.

The Woollybutt (Eucalyptus miniata A. Cunn. ex Schau.).

This tree attains a height of about 40 ft. but a fair average height is about 30 ft., the trunk being up to 18 ft. long and up to 2 ft. in diameter. The timber is red and hard but susceptible to attacks from termites. The branches spread widely.

A characteristic of the species is its ability to flower freely when small. Plants 4 to 6 ft. in height and probably 3 to 4 years old from seed, are often very floriferous and the flowers are often larger than those seen on older trees. These orange-vermilion blossoms contrasting vividly with the powdery-white calyx, bud and branchlets, make the tree very attractive and were it in cultivation in the temperate regions it would be a powerful rival to the red-flowered gum of South-Western Australia. The Woollybutt and the Gnaingar are the only two species which have these orange-vermilion flowers.

The home of the Woollybutt in Western Australia is in the North Kimberley district where it is one of the commonest trees of the rough sandstone and quartzite country of the Hann Plateau which lies to the north of the King Leopold Range and is bounded on the east side by the Elgie Cliffs and the Carr Boyd Range. Isolated areas carrying these trees occur on the Cockatoo Sands near the lower reaches of the Ord River, also near Elephant Hill in the same district. To the south and west we encounter smaller woodlands near Goody-Goody (not far from Derby) and between Derby and Yeeda on the Fitzroy River.



WOOLLYBUTT (*Eucalyptus miniata* A. Cunn. ex Schau.).

A—Leaves; B—Young inflorescences (see below); C—Flowers and flower-buds; D—Flower-buds from the Prince Regent River (an elongated form); E—Section of flower-bud; F—Anthers; G—Fruit; H—Section of fruit; I—Fertile seeds; K—Cotyledons. All except B and D are from the Cockatoo Springs (Gardner 7325); D shows buds from the Prince Regent River (Gardner 1358). B represents material from Goody Goody (Fitzgerald 296). The young buds are enclosed in a hard globular structure which ruptures as the buds expand. It may, or may not be normal. —Icon. origin.

In its main area of distribution the Woollybutt is frequently associated with the Messmate (*E. tetrodenta*), but it usually occurs as the principal and dominant tree of the sandstone range country. It extends across the Northern Territory into Northern Queensland.

Woollybutt was first collected by Alan Cunningham who was the botanist with Captain Philip King about 1820. He found it in "craggy declivities near York Sound."

This striking tree flowers from about the commencement of June until the end of July. It produces nectar in abundance and the blossoms are much sought after by small birds of the parrot family, especially budgerigars. The native bees frequently make their hives in its hollow trunks.

The name miniata is taken from the Latin *miniatus* (coloured with cinnabar), which is what we call orange-vermilion, the colour of the filaments of the flowers.

Gnaingar (Eucalyptus phoenicea F. Muell.).

The Gnaingar is much like the Woollybutt in appearance but is a much smaller tree and the branchlets are reddish and angular and not powdery-white like those of the Woollybutt. The flowers also are very different in shape and much more numerous in clusters although they resemble those of the Woollybutt in their orange coloured or vermilion tonings.

Mueller, who described this tree from the vicinity of the Victoria River named it *Eucalyptus phoenicea* from the cinnabar colour of the filaments in allusion to the fiery crimson plumage of the mythical bird, the phoenix.

The phoenix in Egyptian mythology was the "Great Bennu" which lived at Khenensu, identified with Heliopolis, the City of the Sun and the centre of worship of the Sun God. The phoenix resembled an eagle and had feathers that were red and gold in colour. It was sacred to the Sun God and in the best-known version of the myth, the bird was supposed to appear once in every 500 years and build a pyre on which it was burnt—a new phoenix arising from the ashes. (Some authorities identify this mythical bird with the planet Venus which, as the morning star, was the guide to the Sun God. Since this planet after passing the sun reappears as the evening star, it is possible that the story of the burning on the pyre and the reappearance of a new phoenix from the fire or ashes has originated from observations of the planet).

Gnaingar was first collected by R. A. Perry a few years ago in the vicinity of the Chamberlain River in East Kimberley. The accompanying plate was in part drawn from this collection. Since then I have received excellent flowering material from Karungie on the Durack River, collected by Mr. David Rust. I have not seen the living tree but the bark supplied by Mr. Rust is very much like that of the Woollybutt. The Gnaingar is associated with the Woollybutt, and this also holds good for its distribution in the Northern Territory.

BOTANICAL DESCRIPTIONS

Eucalyptus miniata A. Cunn. ex Schau.

Tree attaining a height of about 40 ft. with a trunk up to 2 ft. in diameter, the bark persistent on the greater part of the trunk; the branches smooth and white or yellowish-white, the branchlets powdery-white; timber reddish-brown, hard and dense. Leaves alternate, broadly lance-shaped or ovate-lanceolate, stalked, the blade narrowed into the stalk, the apex acute, dark green and almost shining on the upper side, paler underneath, the lateral nerves spreading and fine, the intramarginal nerve close to the leaf-margin.

Flowers in umbels of 3-7, lateral or in the axils of the leaves, the peduncle (common stalk) stout, spreading or recurved, terete or slightly flattened, expanded at the summit. Flowers on very short pedicels scarcely distinguishable from the base of the calyx, the buds 6-10-ribbed, the operculum obtuse calyx-tube narrow-campanulate, the operculum hemispherical or ovoid, about half as long as the calyx-tube, comparatively thin. Stamens numerous, the filaments incurved in the bud, the anthers large, attached by the middle, opening in distinct longitudinal slits. Style elongated, rather slender, the upper portion external to the stamens in the bud and then recurved, later straight or flexuose. Fruit urn-shaped or almost cylindrical, over an inch in length, contracted at the summit, the capsule deeply

GNAINGAR (*Eucalyptus phoenicea*, F. Muell).

A—Branchlet and leaves; B—Flower-buds and peduncle; C—Section of flower-bud (after Mueller); D—Anthers (after Maiden); E—Young fruits (after Mueller); F—Fruits; G—Section of fruit; (A, F and G, Perry 3081).

—Icon. composit.

sunk, 3-valved, the valves short and deeply included. Flowering season June to August.

Eucalyptus phoenicea F. Muell.

A tree usually of slender growth, up to 25 ft. tall, the trunk with a papery-flaky somewhat fibrous bark, the upper portion and branches smooth, the branches reddish, slender, and angular. Leaves much like those of *E. miniata* but smaller, of a pale green, alternate or here and there opposite, of the same colour on both surfaces, on rather long stalks, the midrib prominent, the lateral nerves fairly numerous and irregular, the intramarginal nerve subcontiguous with the leaf-margin.

Flowers in axillary clusters, on long slender peduncles, the flowers up to sixteen in the umbel, on slender pedicels, the buds pear-shaped. Calyx-tube narrowly bell-shaped or almost pear-shaped, smooth, the operculum very much shorter and obtusely hemispherical to ovoid. Stamens numerous, all perfect, the filaments inflected in the bud; anthers versatile, broad, opening in longitudinal distinct slits; style slender, straight.

Fruit narrowly urn-shaped to almost ellipsoidal or almost cylindrical, usually with a distinct 'neck' below the orifice, 1-1.5 in. long, many-ribbed, abruptly contracted into the stalk, the capsule deeply included with very short obtuse valves.

SPECIMENS HELP DIAGNOSIS

WRITTEN descriptions of plant diseases are often insufficient for accurate diagnosis. Send specimens, preferably several, showing the disease at various stages. They will usually carry well if wrapped in moist newspapers and enclosed in well-ventilated containers.

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POISON Plants OF WESTERN AUSTRALIA

C. A. GARDNER,
(Government Botanist) and H. W. BENNETTS, D.V.Sc. *(Principal, Animal Health and Nutrition Laboratories)*

THE BIRDSVILLE INDIGO

(Indigofera enneaphylla L.)

THE Birdsville Indigo is a plant of wide distribution, being common on the plains of India as well as being widely diffused in tropical Australia. In Western Australia, besides being widely distributed in many parts of the Kimberley Division, it is particularly abundant on the plains of the Ashburton district, and extends as far south as Williambury on the Minilya River. Other areas in which it is common are the sandy spots around Derby and Broome, where it appears to be spreading. It is also common in Central Australia around Alice Springs. The plant was included by Dymock in his "Vegetable Materia Medica of India" as an antiscorbutic and diuretic.

The plant is typically a perennial which dies down to the soil level in the dry season, but possesses a strong rooting system with remarkable recuperative powers after suitable rain, when it makes rapid regrowth. It assumes two forms, the common prostrate or diffuse form in which the stems radiate from the root and lie close to the ground, forming rosettes of up to 5ft. in diameter when making vigorous growth, but usually smaller. The other form, only seen near Hall's Creek, has erect stems up to 18in. high. The accompanying plate illustrates the prostrate or diffuse form.

The features by which this plant can be most easily recognised are its small clusters of brick-red or scarlet pea-shaped flowers situated at the bases of the leaves (blue-flowered forms are exceptional) and its leaf-form. The leaves consist of a number of leaflets which are typically nine in number, hence the name "enneaphylla," from the Greek *ennea*—nine, and *phyllon*, —a leaf. These leaflets vary in number from seven to 11, but nine is the usual number.

Of importance, is the fact that they are alternate, i.e. the leaflets along one side of the leaf-axis are alternate with those of the other side. They are clothed with rather short and rigid, somewhat glistening hairs which lie close to the leaf surface, and are not attached at the base, but above the base and frequently about the middle, and pointed at both ends. It is important to remember the arrangement of leaflets, since this character serves to separate it from other plants of similar growth and appearance.

After the flowers have fallen, they are replaced by the small clustered pods which are reddish-brown in colour, somewhat four-angled, sharply pointed, and typically two-seeded. The two seeds are separated by a cellular partition which falls away as the seeds are liberated. Rarely one or three seeds are found in the pods. The seeds are hard, reddish, and somewhat four-ribbed.

The shape of the leaflets shows considerable variation; they vary from narrow and shortly acute to broad and more obtuse, but are usually curved towards the

points. Figure "B" in the plate shows a fairly typical leaf-shape except that the leaflets have been flatetned out (they are usually somewhat longitudinally folded along the middle) and the leaf axis is shorter than in the more typical forms.

The Birdsville Indigo shows a preference for sandy silty soils: In its area of distribution it can usually be looked for in two types of country—the flat red sand with a deep drainage, or the lower lying spots in Spinifex country where water lies for a time after showers. After a long dry period when there is no superficial evidence of the plant, a shower can provide sufficient water to produce rapid growth, but under such conditions the stems are usually short, and flowering takes place soon after the stems and leaves develop. In the rainy summer season the growth is rapid, and a dense mass of stems and foliage is produced. Under such conditions dense stands of Birdsville Indigo can be produced in certain low-lying situations, and the plant appears to be relished by all classes of stock.

POISONOUS PROPERTIES

Several species of Indigofera are known or suspected poisonous plants, and of the species found in Australia, *Indigofera enneaphylla,* has been shown definitely to be toxic. It is the cause of a condition in horses known as "Birdsville Disease." The plant is very palatable to stock; sheep and cattle also eat it readily but, apparently, without any harmful results.

For many years conditions variously known as "Walkabout Disease," "Birdsville Disease" and "Kimberley Horse Disease" have caused very serious losses in Northern Australia.

Until recently the cause of these losses was unknown and much confusion existed concerning the distribution and nature of the disease or diseases concerned.

The position was recently much clarified as a result of investigations in Queensland by Moule (1947) and Bell and Everest (1951); in the Northern Territory by Rose, Banks and McConnell (1951), and by a co-operative investigation in the Kimberleys which, as Gardner (1952), reported has incriminated *Crotalaria retusa* as a cause of Kimberley Horse Disease.

It is now evident that there are two quite distinct horse diseases—

(i) Birdsville Disease occurring principally in the Birdsville region of Western Queensland and in Central Australia below the 20th Parallel, in which regions it has caused serious economic losses from deaths and chronic disabilities.

(ii) Kimberley Horse Disease which occurs principally further to the north in the three States of Queensland, Northern Territory and Western Australia.

There is some evidence suggesting that occasional cases of Birdsville Disease may occur in this State but here it is certainly not a source of serious economic loss like Kimberley Horse Disease. We have shown, however, that *Indigofera enneaphylla* growing in the Kimberleys is toxic, as it is in other parts of Australia, and will induce Birdsville Disease, if horses get enough of the plant to eat.

The symptoms of the two diseases may be somewhat similar, but in Birdsville Disease no abnormalities can be seen in any organ of the body on post-mortem examination, whereas in Kimberley Horse Disease pronounced liver damage is the essential feature. This liver damage develops slowly over a period of months or years whereas Birdsville Disease may develop in two or three weeks from the time horses have first had access to the Indigo; the symptoms suggest that the plant affects the nervous system.

NOTES ON BIRDSVILLE DISEASE

Typically cases of the disease develop within a few weeks of an effective rainfall, because the strongly-rooted plant regenerates quickly and soon provides a palatable ration for grazing horses.

It has been shown experimentally that the consumption of 10 lb. daily of fresh plant, may induce symptoms of the disease within two weeks. When smaller amounts are eaten the disease takes longer to develop and may take a more chronic course.

Symptoms.—The initial signs of poisoning are dullness followed by incoordination of gait. The animal stands for long periods in one place, as though asleep on

BIRDSVILLE INDIGO *(Indigofera enneaphylla L.)*

A—Habit; B—Leaf; C—Flower; D—Cluster of pods; E—Pod; F—Pod in section; G—Seed. (A—natural size, B—slightly enlarged; C, D, E, F and G—enlarged.)

Gogo, Fitzroy River. —Icon origin.

its feet. It is disinclined to move. If forced to do so the abnormal gait is evident—the front feet are lifted high and there is a varying degree of absence of control over the hind limbs which tend to drag; there is difficulty in turning or changing direction. Affected horses frequently lie down and find difficulty in struggling to their feet unaided. The animals rapidly lose condition and death results, apparently, from starvation, exhaustion and thirst. (In Kimberley Horse Disease, on the other hand, there is frequently a compulsion to "walkabout" and affected animals are reluctant to lie down.)

In more chronic, non-fatal cases of Birdsville Disease "toe dragging" of hind limbs and a tendency to stumble and fall when ridden or exercised are the salient and persistent features. In these "toe draggers" the points of the toes of the hind feet may be completely worn away. This is a very characteristic feature of Birdsville Disease. Complete recovery of mild cases is fairly common.

The severity or permanence of the disease would appear to be related to the quantity (or degree of toxicity) of the plant eaten. There is experimental evidence the plant may retain its toxicity on drying.

Control.—There is no effective treatment for the disease. Control will depend on preventing horses from having access to quantities of the plant. This may provide a practical solution at least in some affected regions. In the Northern Territory "the fact that the plant seems to grow in profusion in fairly restricted areas, is already providing a key to the solution of the control of horse losses. There is every expectation that with careful survey and appropriate fencing, horses may be denied access to dangerous areas on at least some of the affected leases."

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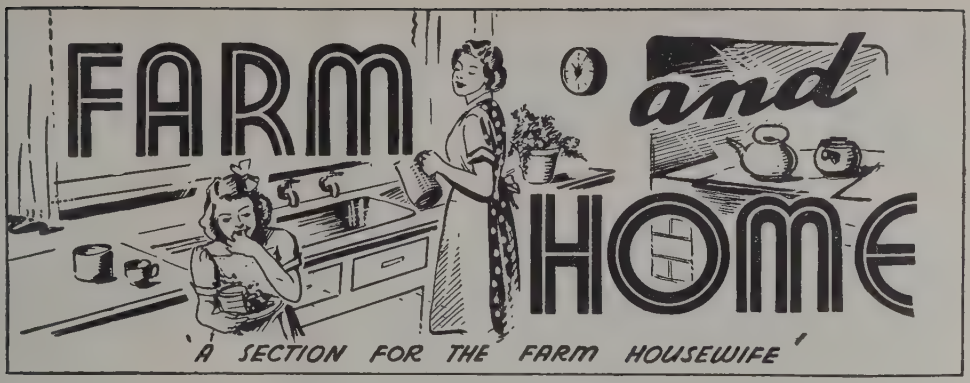

ICING A SPONGE

By BRENDA CLEEVE, Home Science Teacher, Education Department.

WHATEVER icings or fillings are used for sponge cakes, they should be light and soft in keeping with the texture and nature of the cakes themselves. There are several types of soft icing that are particularly suitable for sponge cakes and these offer ample scope for the imaginative decorator.

As the sponge mixture is, in itself, somewhat mild in flavour, icings and fillings with distinctive flavours may be used to advantage to enhance the attraction of the cakes.

A particularly suitable type of icing for sponge cakes, and one which makes a good background for further decorations is a glace icing. This gives a smooth glossy surface which can be decorated by piped work if desired. One drawback to this type of icing is that it cracks easily when dry, therefore, if you plan to use this icing to cover a cake, it is advisable to choose your serving plate before starting work and have the plate close at hand.

Before the cake is iced, or alternatively while the icing is still wet, place the cake on the plate and you will not be disappointed by cracked icing when the cake is to be served.

To prevent icing from running over the sides of the cake and to obtain an even edge of icing on the top, pin a band of greaseproof paper (preferably the waxed variety) around the cake before applying the icing. The paper should stand about a quarter of an inch above the surface of the cake. When the icing is quite dry the paper can be peeled away leaving a smooth even edge.

GLACE ICING

8 tablespoonsful icing sugar.
2 tablespoonsful boiling water, *or*
1 tablespoonful boiling water plus
1 tablespoonful fruit juice.

Method.

(1) Sift the icing sugar into a bowl.

(2) Add the liquid to make the icing the consistency of cream.

(3) Colour and flavour as desired.

This icing should be used while still warm.

Cold water may be used instead of boiling water given in the recipe and the icing can then be warmed by standing the basin in a pan of hot water. If this is done be careful not to boil the icing as this gives it a dull surface.

A knife which has been dipped into boiling water may be used to spread the icing and give the necessary smooth finish, but be careful to shake the knife free of excess water before using as additional water makes the icing too soft and prevents it from setting firmly.

Decorations such as whole or chopped nuts, crystallised fruits, fresh fruits, coloured sugars and cocoanut should be added before the icing cools and hardens.

Another type of icing which is suitable for sponge cakes and lends itself to many variations is a butter icing. This may be used for covering a cake or for piping decorations on to a glace icing base. Butter icing also makes a pleasing filling for sponge cakes.

BUTTER ICING

8 tablespoonsful icing sugar.
4 level tablespoonsful butter.

Method.

(1) Beat the butter until soft.
(2) Gradually beat in the sifted icing sugar.
(3) Add flavouring and colouring as desired.
(4) This icing should be firm enough to hold its shape but not hard.

A more economical icing can be made by using less butter and adding liquid such as fruit juice, milk, cream or egg yolk to give the right consistency.

VARIATIONS TO BUTTER ICING

1. Mocha Butter.

8 tablespoonsful icing sugar.
2 level tablespoonsful butter.
1 tablespoonful dry cocoa.
Sufficient strong coffee essence or liquid to give correct consistency.

2. Orange Butter.

8 tablespoonsful icing sugar.
2 level tablespoonsful butter.
Finely grated rind of an orange. Enough strained orange juice to soften to required consistency.

3. Butter Fluff.

Add one stiffly beaten white of egg to the basic butter icing recipe above.

4. Chocolate Vienna Icing.

8 tablespoonsful icing sugar.
2 level tablespoonsful butter.
2 oz. melted chocolate.
Sufficient wine or brandy to soften.

CLEANING OF WHITE KID GLOVES

THE long white kid gloves which are now becoming very popular for formal occasions are apt to soil easily, but they may be easily restored to their original condition with a little care and attention.

After wearing, if the gloves are only slightly soiled, they should be smoothed into shape and dusted with powdered magnesia, or rubbed gently with a magnesia block. Magnesia is obtainable from almost any chemist but, if unprocurable, white talcum powder may be substituted.

After treatment the gloves should be rolled up in a clean cloth until required again. Before wearing, the magnesia should be shaken out and a small soft brush should then be used to remove the powder from the pores of the kid.

If the gloves are too badly soiled for the magnesia treatment to be effective, place them in a screw-top jar, cover with white spirit or clear unadulterated petrol. Screw the lid on tightly and then shake the jar so that the fluid penetrates the skin completely. Allow the gloves to remain in the fluid overnight.

Next day remove the gloves from the jar, pull them gently into shape and spread them out on a clean cloth.

Place the cloth in a cool airy spot to accelerate the evaporation of the spirit. When the gloves are thoroughly dry any slight stiffness may be removed by gently rubbing them between the hands, and the treatment should restore the gloves to their original snowy whiteness.

Never forget that these fluids are inflammable and explosive. Always carry out the cleaning operation and the drying of the gloves well away from any naked flame.

Fig. 1.—Portion of a Kimberley Station showing the results of a prolonged drought period.

THE WALLABY MENACE IN THE KIMBERLEYS

CONTROL EXPERIMENTS, JUNE–OCT. 1953

By A. R. TOMLINSON, Chief Vermin Control Officer, C. D. GOODING, Vermin Control Research Officer, and L. A. HARRISON, Vermin Control Research Technician.

COUNTLESS thousands of Sandy Wallabies (Macropus agilis) have long been a menace to the pastoral industry in the Kimberleys. These animals eat almost the same foods as the sheep and cattle and have substantially reduced the stock-carrying capacity of the river-frontage areas where they are found in the greatest numbers. Research into control methods was commenced in 1952 when Mr. L. A. Harrison undertook some investigations designed to ascertain the best line of approach to a poisoning campaign.

Some preliminary experiments were attempted using lures and supplements, but because of the inconclusive nature of the results they were all repeated, this time under controlled conditions. Seasonal conditions in this period were similar to those experienced in the previous season. Conditions up until March, 1954, were still considered as drought.

Besides the work started last year, a certain amount of purely ecological work was undertaken. This was confined to sexing, weighing and recording of "joeys" and a little observational data on distribution.

MECHANICAL FACTORS

A machine was designed and built for easy manufacture of baits. This consisted of a 3-5 H.P. air-cooled petrol engine connected to a poultry mash mixer by means of V-belts. Through a hole in the bottom of this machine the moist bran and pollard mixture fell into the hopper of a worm-driven pellet-former, which had originally been manufactured for laying rabbit poison. From the extrusion hole in the end of the pellet former, pellets emerged at the rate of 140 per minute. Four different diameters of pellets were

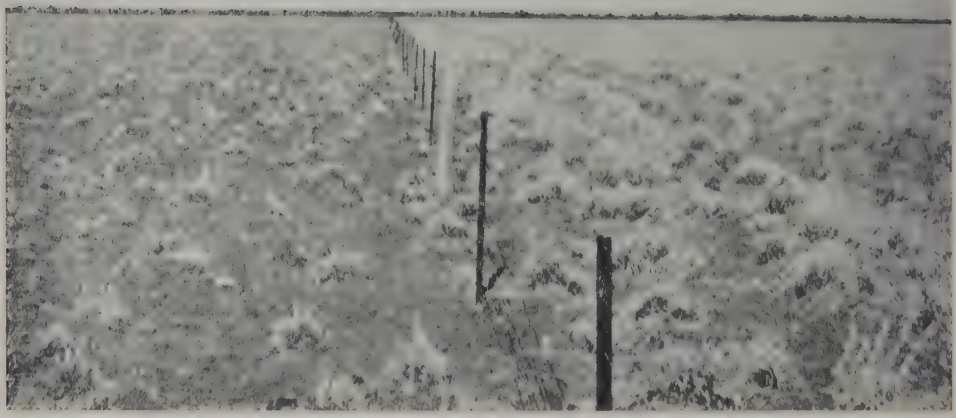

Fig. 2.—The fence-line dividing two properties. Note effects of overgrazing on the left of the picture.

combined with three lengths giving a range of 12 different shapes and sizes. From this assortment of pellets the wallabies consistently chose those approximately 1in. long and $\frac{7}{8}$in. in diameter. The larger pellets were also consumed, but the 1in. by $\frac{7}{8}$in. were the most economically practicable. This pellet size was used in all later experiments.

MIXTURE PROPORTIONS

As a basis on which to commence work a mixture of 2 parts of pollard: 1 of bran: 1 of water (by volume) was chosen and used in all early experiments. Later experience prompted a change of the mixture to 1 part of pollard; 2 parts bran and 1 part of water.

This, which was subsequently termed the "soft" pellet—the original mixture being termed "hard"—proved much more satisfactory for the following reasons.

(i) Being softer, the wallaby had a better chance of consuming the pellet before tasting the poison.

(ii) The "soft" pellet dried more quickly with less internal fermentation. The "hard" pellet was apt to cake hard on the outside, leaving the inner portions moist and liable to fermentation.

(iii) The ideal bait should be one that crumbles readily under the conditions experienced in the "Wet." Following tests in dropping from a standard height after exposure to humid conditions, the "soft" pellet mixture was adopted and used in all subsequent work.

The "hard" pellet, when exposed to humid conditions, became covered with moulds and flyblown but did not entirely disintegrate. (If hand-making of pellets is practised, the "hard" formula may be more suitable, but the "soft" mixture is definitely better if the pellets are machine-made.)

LURES

All the lures and supplements examined last year were again tested, with the addition of eucalyptus. In the quantities tried, aniseed, linseed oil, linseed meal and meatmeal were definitely repellant to wallabies, while dicalcic phosphate, rhodium, oil of cymini, amyl acetate, chaff and eucalyptus proved of no benefit in increasing consumption of baits.

POISON REPELLANCY (STRYCHNINE)

As yet no really conclusive data is available regarding this point but some observations are worth recording.

It was noticed that when soft and hard pellets were laid side by side the hard pellets were always left after the soft had been consumed. This was possibly due to the longer period required to chew a hard bait and the subsequent bitterness that was detected by the animal. That, is the first important point. The second is that, when laid together, alkaloid pellets were usually preferred to those containing the soluble form of the poison. A small confirmatory test was laid out embracing both heavily and sparsely populated areas. The number of baits laid was only small but gave an indication that, where competition for food was great, then all baits, irrespective of taste, would be consumed, whereas in an area of relative food abundance, the alkaloid baits were preferred. As there is very little difference in price, it appears reasonable to recommend that the alkaloid (pure) be used in preference to soluble strychnine. When procurable, powdered strychnine is easier to handle than crystals and should always be used. It disperses much more easily and gives a more uniform bait. Mixing in the dry state, with the pollard, is a convenient way of achieving this result.

POISON REQUIREMENTS

Pen experiments were conducted at Quanbun Station to find out the quantity of poison needed to kill this species of wallaby. (This is referred to as the Minimal Lethal Dose or M.L.D.). The method of doing this was to insert a length of metal tubing into the oesophagus of the animal and through the centre of this tubing to lower a piece of fine rubber tubing into the alimentary tract. A hypodermic syringe was then connected to the rubber tube and the requisite dose administered. All doses were regulated according to body weight. A summary of our findings was that (in round figures), the M.L.D. of strychnine was 0.8 milligrammes per pound body weight and the M.L.D. of "1080" was 0.2 mgms. per pound body weight.

Strychnine is the only one of these poisons at present available to the general public. To convert the above figures to a practical basis—

Fig. 3.—Erecting a trapping yard at a mill to obtain wallabies for pen experiments.

Fig. 4.—The baitmaking machine on the right with baits spread out to dry before being bagged for distribution.

Mix 1 oz. of strychnine for every 1,720 pellets made. Each pellet then contains the lethal dose of ¼ gr. (calculated for an average animal of 20 lb. weight).

WHOLESALE POISONING

Several attempts were made at "wholesale" poisoning. Two of the more successful of which are documented here.

Ram Paddock, Quanbun Station.

In order to use up a lot of "free feed" (unpoisoned) pellets on hand, "hard" pellets were used in this experiment. Visual counts of wallabies were made from a vehicle when laying free feed pellets.

September 7—382 wallabies counted, 10,000 free feed pellets laid.

September 10—No count, 20,000 free feed pellets laid.

September 12—523 wallabies counted, Nil.

September 15—No count, 20,000 free feed pellets laid.

September 16—877 wallabies counted, 3,000 poisoned baits and 5,000 free feed laid.

The poisoned pellets each contained 1½ grains of soluble strychnine. The idea of laying "free feed" pellets out with the poisoned baits was merely to cut down on cost of strychnine which, with 1½ grains to the pellet amounted to an appreciable sum. The results of this trial are most interesting and illustrate some of the points mentioned before.

A lot of the "hard" poisoned pellets remained after eight days but none of the "free feed" pellets. A large percentage of the poison pellets had been nibbled and rejected. A wallaby count taken on September 19 showed 368 still in the area. The area was poisoned again on October 4 using "soft" ½-grain alkaloid baits, and even though the animals had been partially educated against baits their numbers were further reduced to 43. In this experiment the following factors were unsuitable and the wallabies reacted accordingly:—

(a) Hard and not soft pellets were used.

(b) Soluble and not alkaloid strychnine was used.

(c) The concentration of poison was too high (1½ grs. to the bait).

Then, when conditions were made acceptable, the wallabies took the baits well and a big reduction followed. The total overall kill achieved during this trial was (calculated on the largest pre-poisoning figure) 95 per cent. Results of this magnitude are not generally expected using strychnine poison. This illustrates the control exerted on poison consumption by the amount of feed present at the time. (In this case practically no feed was available apart from the baits).

Alexander Island—Quanbun Station.

A second trial was conducted on Alexander Island employing three free feeds—

October 14—396 wallabies counted, 25,000 free feed laid.

October 17—303 wallabies counted, 18,000 free feed laid.

October 19—235 wallabies counted, 20,000 free feed laid.

Five thousand poison baits of soft consistency, each containing ½ grain alkaloid strychnine were laid on October 21. Counts made on successive days following this, showed a gradual decline—

October 22—74 (201 Carcasses counted from vehicle).

October 23-30.

October 24—17.

As far as could be ascertained, baits, which had been thrown from a moving vehicle at random, had all been consumed. There figures, when calculated on the largest pre-baiting count, illustrate a kill of over 95 per cent. It seems then that a satisfactory control does exist in the form of "soft" ½-grain alkaloid strychnine baits. However, it is felt that further testing over a widespread area, involving varying numbers of free feeds is still necessary.

COST OF BAIT MAKING

Four hundred and twelve lb. of wet mash was made up by machine during one test period. This consisted of 152 lb. bran, 109 lb. pollard, 151 lb. of water (2:1:1 by volume). The machine was run for 3 hours, 11 minutes and made 12,300 baits.

Cost of 152 lb. bran (ex Perth)=31.14s.

Cost of 109 lb. pollard (ex Perth)=22.49s.

Cartage to wharf Fremantle (10s. per ton)=1.17s.

Handling charges (both ends)=3.46s.

Freight (Fremantle to Derby)=12.00s.

Cartage Derby to site (average £6 per ton)=14.04s.

Labour=22.62s.

Fuel for engine (3 hours 11 minutes) =1.2s.

Depreciation on machine=2.71s.

Total Cost=110.85s.
=0.108d. per pellet

Cost of ½ gr. strychnine per pellet =0.163d.
(13s. per oz.)

Total Cost per bait=0.272d.

It is hoped to continue this work in the coming season. The main programme will consist of wholesale baiting of extensive areas and thorough testing of the above finding from the point of view of practical application by the pastoralist.

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Arrangements have been made for the compilation of a comprehensive index to be incorporated in the December issue—a feature which will greatly enhance the value of the Journal as a work of reference.

STOCK FOODS

All foods for stock sold in Western Australia are required by the Feeding Stuffs Act, 1928-51, to be registered annually with the Department of Agriculture. For the purposes of the Act "Foods for Stock" include stock licks, which in turn embrace all preparations claimed to supply or primarily intended to supply mineral matter to stock.

The registration year for stock foods commences on 1st July each year. When making application for registration manufacturers must submit a guaranteed analysis for each of their products, together with a list of ingredients used in each stock food. Regular inspection and sampling is carried out by officers of the Department to see that stock foods comply with the registered analysis.

Sellers of stock foods are required by the Feeding Stuffs Act to ensure that to each package is clearly and conspicuously attached a label or brand showing the name and place of business of the manufacturer or importer, the registered brand and name of the food or lick and the registered analysis.

A list of stock foods and stock licks which have been registered for the current registration year appears hereunder together with a list of results of analyses of official samples taken by Departmental inspectors.

Before purchasing any food or lick buyers are advised to consult the list of registered stock foods and stock licks from which a comparison of foods or licks of similar types can be made and also to ensure that packages are correctly labelled. If any doubts arise inquiries should be made at the Department of Agriculture, where information on the provisions and requirements of the Feeding Stuffs Act and advice on other aspects of stock feeding can be obtained.

Stock Food.	Reg. No.	Brand.	By whom Registered.	Materials from which Made.	Registered Analysis.						
					Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride. (NaCl).	Phosphoric Acid. (P_2O_5).	Calcium. (Ca).	Other.
					% (Min.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	
A.—Simple Foods.											
1.—Meat Meals.											
Whale Meal	3	N.W.W.	Nor'-West Whaling Co., Ltd.	Whale carcass	58·0	8·0	1·0	0·4 0·2*	13·0 9·0*	12·0 8·0*	.. ....
Meat Meal	4	Coogee	Anchorage Butchers Pty., Ltd.	Waste meat products	36·9	18·6	1·3	1·0 *nil**	12·5 9·0*	12·5 8·0*	....
Whale Meal	25	CHEYNES BEACH WHALING CO. PTY., LTD.	Cheynes Beach Whaling Co. Pty., Ltd.	Whale meat, offal	60·0	21·0	1·0	1·0 *nil**	1·5 *nil**	1·0 *nil**	....
Meat Meal	30	MIDLAND	The Midland Junction Abattoir Board	Animal offal and residues	52·0	15·0	2·0	1·5 *nil**	6·0 4·0*	5·5 3·5*	....
Whale Meal	38	AUSTRALIAN WHALING COMMISSION	Australian Whaling Commission	Whale carcass	60·0	10·0	1·0	0·8 0·4*	10·5 8·5*	9·5 7·5*	.. ..
Meat Meal	52	W.A.M.E.	The W.A. Meat Export Works	Meat, bone, blood	45·0	13·0	2·0	1·0 *nil**	12·0 9·0*	11·0 6·0*	....
Do.	182	ORANGE GROVE	Westralian Farmers Co-op., Ltd.	Animal refuse	53·0	15·0	2·0	....	. .	....	....
2.—Meat and Bone Meals.											
Meat and Bone Meal	1	TB & S in diamond Albany A	T. Borthwick & Sons (A'sia), Ltd.	Animal offal	50·0	20·0	4·0	1·0 *nil**	9·0 2·0*	8·0 1·0*	....
Do. do.	2	TB & S in diamond Albany B	do. do. do.	do.	40·0	17·0	4·0	1·0 *nil**	12·0 8·0*	10·0 7·0*	....
Do. do.	20	APEX	E. J. Fry Pty., Ltd.	Meat, bone, blood	37·0	11·5	2·0	1·0 *nil**	15·0 5·0*	15·0 5·0*	....

Do. do.	23	PENNELL'S ..	C. A. Kirkby & Sons ..	Meat, bone	50·0	12·0	4·0	1·2 0·5*	14·0 10·0*	14·0 10·0*	....	....
Bone and Meat Meal	32	KITCHEN'S .	J. Kitchen & Sons Pty., Ltd.	Animal fat and bone	42·5	10·0	2·5	1·5 *nil*	18·0 13·0*	15·2 11·0*	....	....
Meat and Bone Meal	45	IBIS	Wright's, Ltd.	Animal waste	45·0	13·5	3·0	...	....	. .	....	....
Do. do.	115	ABERDEEN ..	W. R. & N. N. Clarke	Meat and bones	50·0	13·0	3·0	....	....	.. .	....	. .
Do. do. ...	116	S.M.P. ..	do. do. do.	do.	50·0	13·0	3·0	. ..	....	....	....	. .
Protein Meat and Bone Meal	117	IMPERIAL ...	W. Angliss & Co. (Aust.) Pty., Ltd.	Animal meat, bones, livers .	50·0	16·0	2·0	....	....	....	....	. .
Feeding Meat and Bone Meal	173	MERCURY	H. C. Sleigh, Ltd.	Animal meat and bone	45·0	14·0	1·5	0·7 0·6*	20·0 17·1*	13·0 11·3*	....	....
3.—*Liver Meals.*												
Liver Meal	118	IMPERIAL	W. Angliss & Co. (Aust.) Pty., Ltd.	Animal livers and lungs ...	65·0	20·0	1·0	....	....	....	....	....
4.—*Whale Solubles.*												
Spray Dried Whale Solubles	39	AUSTRALIAN WHALING COMMISSION	Australian Whaling Commission	Whale carcass	82·0	0·4	0·1	2·0 1·4*	1·4 1·1*	1·3 1·0*	....	....
5.—*Fish Meals.*												
Cra Meal	5	ANCHO	Anchorage Butchers Pty., Ltd.	Waste crayfish products	36·0	12·0 9·0*	10·0	3·5 2·5*	7·0 4·0*	14·0 11·0*	....	....
6. *Milk Foods.*												
Krafco	40	KRAFCO	Kraft Foods, Ltd.	Cheese whey	10·0	1·0 0·5*	*nil*	4·2 3·8*	2·4 1·0*	1·5 0·5*	....	....
Lactokraft	41	LACTOKRAFT	do. do.	do.	10·0	1·0 0·1*	*nil*	4·2 3·8*	2·4 1·0*	1·5 0·5*	....	....
Dried Buttermilk Powder	43	SUNNY WEST	South-West Co-operative Dairy Farmers, Ltd.	Buttermilk	29·0	11·0 2·0*	0·5	3·0 1·0*	2·5 1·5*	1·5 0·5*	....	....
7.—*Wheat and Wheaten By-products.*												
Wheat Meal	54	WESFARMERS	Westralian Farmers Co-op., Ltd.	Wheat	9·0	0·5*	3·0	1·0 *nil*	1·0 *nil*	1·0 *nil*	....	....
Rolled Wheat	55	do. ...	do. do. do.	do.	9·0	0·5*	3·0	1·0 *nil*	1·0 *nil*	1·0 *nil*	....	....
Wheat Meal . ..	103	MILLERS	W. H. Milne & Co. . .	do.	8·0	.. .	5·0	.. .	....	....	....	....
Do.	119	"C" MEAL	W. Thomas & Co. (W.A.), Ltd.	do.	8·0	.	10·0	....	....	...	....	....
8.—*Oat and Oaten By-products.*												
Oat Meal	56	WESFARMERS	Westralian Farmers Co-op., Ltd.	Oats	8·0	1·0*	5·0	1·0 *nil*	1·0 *nil*	1·0 *nil*	....	....
9.—*Oil Seed Meals.*												
Pure Linseed Oil Meal	95	M.L.M. .. .	Elder, Smith & Co., Ltd.	Pure linseed from which proportion of the oil content has been extracted by mechanical pressure	30·0	3·5*	10·0	....	.	....	....	....
10.—*Brewers' Dried Yeast.*												
Brewers' Dried Yeast	174	B.D. YEAST	K. McGibbon	Yeast	45·0	1·5*	1·5	....	....	0·12	....	....
B.—Compound Foods.												
1.—*Cattle Foods.*												
Cattle Food	11	EVE-LYN	Tropical Traders & Patersons, Ltd.	Pollard, salt, limestone, chalk, animal charcoal, molasses, sulphur, sulphate of iron, copper sulphate, gristed wheat, sodium bicarbonate, ginger, gentian, foenugreek, limonite, coriander, potassium bicarbonate, cobalt chloride, nickel chloride, barley meal, rye meal	5·0	1·0*	5·5	13·0 12·0*	4·25 3·25*	9·5 8·5*	Sulphur 3·6 (max.)	....

* Minimum.

STOCK FOODS—continued

Stock Food.	Reg. No.	Brand.	By whom Registered.	Materials from which Made.	Registered Analysis.						
					Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride. (NaCl).	Phosphoric Acid. (P_2O_5).	Calcium. (Ca).	Other.
					% (Min.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	
Sweetened Dairy Meal	57	WESFARMERS	Westralian Farmers Co-op., Ltd.	Bran, pollard, wheat germ, peanut and coconut meals, brewers grain, rolled wheat, bone meal, meat meal, limestone, salt, bluestone	16·0	2·5*	10·0	3·5 2·0*	3·5 2·3*	2·5 2·0*	....
Do. do.	58	WESTERN	do. do. do.	do. do. do. do.	16·0	2·5*	10·0	3·5 2·0*	3·5 2·3*	2·5 2·0■	....
16% Protein Sweet Dairy Food	120	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Bran, pollard, grain meals, brewers' grains, malt combings, bone flour and/or ground phosphate, technical urea, molasses, oyster flour, sodium chloride, manganese sulphate, stabilised iodine, cobalt sulphate	16·0	1·5*	10·0	2·0 1·0*	2·5 1·0*	4·0 1·0*	Manganese 60 p.p.m. Iodine 1·2 p.p.m.
16% Protein Sweet Dairy Nuts	121	do.	do. do. do.	do. do. do. do.	16·0	1·5*	10·0	2·0 1·0*	2·5 1·0*	4·0 1·0*	Manganese 60 p.p.m. Iodine 1·2 p.p.m.
Dairy Food	175	P.P.	Picton Produce Pty., Ltd.	Bran, pollard, barley meal, oat meal, linseed, bone meal, molasses, salt, ground lime, trace elements (copper and cobalt)	14·0	3·0*	12·5	1·5 0·5*	1·5 0·5*	1·5 0·5■	....
Dairy Meal	185	LINMIX	South-West Stock Food Co.	Linseed (crushed), bran, oats, flax pollard, ground limestone, salt, "Tracene" (containing cobalt, iron, nickel, copper, manganese, zinc, magnesium)	11·9	8·2*	14·1	..	..	....	....
2.—*Calf Foods.*											
Calf Food	12	EVE-LYN	Tropical Traders & Patersons, Ltd.	Gristed wheat, pollard, linseed (whole), salt, sugar, chalk, turmeric, sodium bicarbonate, cream of tartar, foenugreek, ginger, coriander, copper sulphate, bole armenian, barley meal, rye meal	8·5	2·0*	3·86	3·5 2·5■	1·25 0·25*	1·0 0·2*	Sulphur 1·75 (max.)
Calf Meal	59	WESFARMERS	Westralian Farmers Co-op., Ltd.	Bran, pollard, rolled wheat, meat meal, peanut meal, buttermilk, bone meal, ground limestone	18·0	4·0*	7·0	1·0 *nil**	3·5 2·3*	2·0 1·5*	....
Calf Food	96	KAF-O-VITE	Goldsbrough Mort & Co., Ltd.	Wheaten and rice pollard, barley meal, meat meal, wheat meal, coconut meal, peanut meal, safflower meal, lucerne meal, calcium carbonate, bone charcoal, sugar	16·0	6·0*	8·0	1·0 *nil**	.. 2·5*	.. 4·2*	....
Do.	108	HARPER'S "STAR"	Robt. Harper & Co., Ltd.	Wheat, oats, rice, barley, linseed, mustard, branning, whiting, salt, peas, condiments	12·0	2·5*	10·0	2·0 1·0*	2·5 1·0■	1·0 0·25*	....
Do.	109	PARSONS	Parsons Bros. & Co. Pty., Ltd.	Wheat, oat branning, linseed, ground limestone, common salt	12·0	2·0*	6·0	1·28 1·20*	1·20 1·0*	2·15 1·95*	....

20% Protein Vitamised Calf Milk	122	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Buttermilk powder, pollard, blood meal, bone flour and or ground phosphate, oyster flour, sodium chloride, manganese sulphate, stabilised iodine, cobalt sulphate, micratized vitamins A and D3	20·0	1·5*	6·0	3·0 0·5*	2·5 0·2*	2·5 0·5*	Manganese 60 p.p.m. Iodine 1·2 p.p.m.	Cobalt. 3 p.p.m
20% Protein Vitamised Calf Food	123	do.	do. do. do.	Linseed meal, pollard, bone flour and or ground phosphate, oyster flour, sodium chloride, manganese sulphate, stabilised iodine, cobalt sulphate, micratized vitamins A and D3	20·0	2·5*	8·0	3·0 0·5*	2·5 0·2*	2·5 0·5*	Manganese 60 p.p.m. Iodine 1·2 p.p.m.	Cobalt 3 p.p.m.
Calf Food ..	149	VETAMAC	A. H. McDonald & Co.	Wheat pollard, maize meal, linseed meal, milk sugar, mutton bird oil	15·35	7·5*	1·5	*nil**	*nil**	1·6 1·45*	....	....
Calf Food (Vitamised)	150	do.	do. do. do.	Wheat pollard, maize meal, linseed meal, milk sugar, mutton bird oil, vitamins A and D3	15·35	7·5*	1·05	*nil**	*nil**	1·6 1·45	....	....
Calf Food	154	WESTERN .	David Gray & Co., Ltd.	Malt grains, peanut meal, milk powder, yeast, pollard	18·0	6·0	7·5	1·5 0·5*	1·5 0·5*	1·0 0·15	....	....
Do. . . .	176	P.P.	Picton Produce Pty., Ltd.	Pollard, linseed meal, dried buttermilk, bone flour	22·0	3·0*	7·5	0·5 0·1*	2·5 1·0*	2·5 1·0*	..	....
3.—Sheep Foods.											....	....
Sheep Food	13	EVE-LYN	Tropical Traders & Patersons, Ltd.	Pollard, salt, limestone, chalk, animal charcoal, molasses, sulphur, sulphate of iron, copper, sulphate, gristed wheat, sodium bicarbonate, ginger, gentian, foenugreek, limonite, coriander, quassia, potassium bicarbonate, cobalt chloride, nickel chloride, barley meal, rye meal	5·0	1·0*	5·0	13·5 12·5*	4·0 3·5*	9·6 8·6*	Sulphur 2·75 (max.)	....
Maintenance Sheep Cubes	60	WESFARMERS	Westralian Farmers Co-op., Ltd.	Bran, pollard, wheat meal, wheat germ, peanut meal, meat meal, limestone, salt, cobalt, copper	14·0	4·5*	6·5	3·5 2·0*	3·5 2·3*	2·5 2·0*	....	....
Sheep Breeder Cubes	61	do.	do. do. do.	do. do. do. do.	16·0	5·0*	8·0	3·5 2·0*	4·5 3·5*	2·5 2·0*	....	....
Ewe and Lamb Sheep Nuts	153	WESTERN ...	Hemphil Gray Oil Mills Pty., Ltd.	Malt grains, yeast, linseed, meat meal, whale solubles, cobalt chloride, copper sulphate, vitamin B	20·0	3·0*	7·5	1·5 0·5*	1·5 1·0*	2·0 1·0*	....	....
11% Protein Maintenance Sheep Nuts	183	THOMAS	W. Thomas & Co. (W.A.). Ltd.	Bran, pollard, grain meals, oat offal, malt combings, technical urea, bone flour and/or ground phosphate, molasses, oyster flour, salt	11·0	1·0*	15·0	2·0 1·0*	2·0 0·5*	3·5 1·5*	Manganese Copper Iodine 1·2 p.p.m.	Cobalt 3 p.p.m.
21% Protein Ewe, Lamb and Breeders Nuts	184	do.	do. do. do.	Dried whale solubles and/or linseed meal, bran, pollard, malt combings, technical urea, bone flour and/or ground phosphate, molasses, oyster flour, sodium chloride	21·0	2·0*	11·5	4·0 2·0*	3·0 1·0*	4·0 2·0*	Manganese 60 p.p.m. Iodine 1·2 p.p.m.	Cobalt 3 p.p.m.
4.—Poultry Foods.												
Special Laying Mash	8	MAYCO	The Maylands Milling Co. Pty., Ltd.	Bran, pollard, wheat meal, meat meal, bone meal, shell grit, salt	17·0	3·5*	5·0	1·0 0·75*	3·0 2·5*	3·5 3·0*	..	....
Laying Mash	24	K.B.	C. A. Kirkby & Sons	Wheat, meat meal, bone meal, bran, pollard, oyster flour	18·0	3·5*	7·0	2·0 0·25*	4·0 1·2*	5·0 1·9*	..	..
Do.	47	EGGLAYER	Barrow Linton & Co.	Bran, pollard, wheat meal, meat meal, bone meal, shell grit, salt	17·0	3·5*	5·0	1·0 0·75*	3·0 2·5*	3·5 3·0*	..	..
Fattening Mash	48	DUKKO	do. do.	Bran, pollard, wheat meal, meat meal, bone meal, shell grit, salt, riboflavin, emulsified fish oil	15·0	3·5*	5·0	1·0 0·75*	3·0 2·5*	3·5 3·0*	..	..

*. Minimum.

STOCK FOODS—continued

Stock Food.	Reg. No.	Brand.	By whom Registered.	Materials from which Made.	Registered Analysis.							
					Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride. (NaCl).	Phosphoric Acid. (P_2O_5).	Calcium. (Ca).	Other.	
					% (Min.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)		
Laying Mash No. 1	62	WESFARMERS	Westralian Farmers Co-op., Ltd.	Bran, pollard, rolled wheat, oat meal, meat meal, bone meal, oyster flour	16·0	4·0*	7·0	1·0 *nil**	3·5 2·3*	2·5 2·0*	.. ....	... .
Laying Mash No. 1 (A & D3)	63	do.	do. do. do.	Bran, pollard, rolled wheat, oat meal, meat meal, bone meal, oyster flour, stabilised vitamins A and D3	16·0	4·0*	7·0	1·0 *nil**	3·5 2·3*	2·5 2·0*	... .	....
Laying Pellets No. 1	64	RED COMB	do. do. do.	Bran, pollard, rolled wheat, oat meal, meat meal, bone meal, oyster flour	16·0	4·0*	7·0	1·0 *nil**	3·5 2·3*	2·5 2·0*	....	....
Laying Pellets No. 1 (A & D3)	65	do.	do. do. do.	Bran, pollard, rolled wheat, oat meal, rolled wheat, meat meal, bone meal, oyster flour, stabilised vitamins A and D3	16·0	4·0*	7·0	1·0 *nil**	3·5 2·3*	2·5 2·0*	....	....
All-Mash	66	WESFARMERS	do. do. do.	Bran, pollard, rolled wheat, oat meal, meat meal, bone meal, oyster flour	16·0	4·0*	7·0	1·0 *nil**	3·5 2·3*	2·5 2·0*	....	... .
All-Mash (A & D3)	67	do.	do. do. do.	Bran, pollard, rolled wheat, oat meal, meat meal, bone meal, oyster flour, stabilised vitamins A and D3	16·0	4·0*	7·0	1·0 *nil**	3·5 2·3*	2·5 2·0*	....	....
All-Mash Pellets	68	RED COMB	do. do. do.	Bran, pollard, rolled wheat, oat meal, meat meal, bone meal, oyster flour	16·0	4·0*	7·0	1·0 *nil**	3·5 2·3*	2·5 2·0*	... ...	....
All-Mash Pellets (A & D3)	69	do.	do. do. do.	Bran, pollard, rolled wheat, oat meal, meat meal, bone meal, oyster flour, stabilised vitamins A and D3	16·0	4·0*	7·0	1·0 *nil**	3·5 2·3*	2·5 2·0*	....	....
All-Mash	70	WESFARMERS "P"	do. do. do.	Bran, pollard, rolled wheat, gristed oats, meat meal or whale solubles, bone meal, oyster flour	16·0	4·0*	7·0	1·0 *nil**	3·5 2·3*	2·5 2·0*	....	....
All-Mash (A & D3)	71	do.	do. do. do.	Bran, pollard, rolled wheat, gristed oats, meat meal or whale solubles, bone meal, oyster flour, stabilised vitamins A and D3	16·0	4·0*	7·0	1·0 *nil**	3·5 2·3*	2·5 2·0*	....	... ...
Fattening Mash ..	72	WESFARMERS	do. do. do.	Bran, pollard, oat meal, rolled wheat, meat meal	13·0	4·0*	7·0	1·0 *nil**	1·2 0·7*	1·0 0·5*	....	....
Laying Mash No. 1	104	MILLERS ..	W. H. Milne & Co. .	Bran, pollard, wheat meal, meat meal, bone meal, gristed oats, oyster flour, common salt	16·0	3·0*	6·0	1·5 0·75*	3·0 1·0*	3·5 1·0*	....	....
Fattening Mash	105	do.	do. do.	Bran, pollard, gristed oats, meat meal, wheat meal, common salt, limestone	13·0	3·0*	6·0	1·5 0·75*	3·0 1·0*	3·5 1·0*	....	....
16% Protein Laying Mash No. 1	124	THOMAS ..	W. Thomas & Co. (W.A.), Ltd.	Bran, pollard, grain meals, wheat germ, whale meal, dried whale solubles, whale solubles and/or meat meal, oyster flour, bone flour and/or ground phosphate, sodium chloride	16·0	2·5*	6·0	2·0 0·5*	3·5 1·0*	3·75 1·0*	... .	....
16% Protein Laying Pellets No. 1	125	do.	do. do. do.	do. do. do. do.	16·0	2·5*	6·0	2·0 0·5*	3·5 0·75*	3·75 1·0*	....	....

16% Protein Vitamised Laying Mash No. 1	126	do.	do.	do.	do.	Bran, pollard, grain meals, wheat germ, whale meal, dried whale solubles, whale solubles and/or meat meal, oyster flour, bone flour and/or ground phosphate, sodium chloride, lucerne meal, micratized vitamins A and D3	16·0	2·5*	6·0	2·0 0·5*	3·5 1·0*	3·75 1·0*	....	....
16% Protein Vitamised Laying Pellets No. 1	127	do.	do.	do.	do.	do. do. do. do.	16·0	2·5*	6·0	2·0 0·5*	3·5 0·75*	3·75 1·0*	....	....
20% Protein Laying Mash	128	do.	do.	do.	do.	Bran, pollard, grain meals, wheat germ, whale meal, dried whale solubles, whale solubles and/or meat meal, oyster flour, bone flour and/or ground phosphate, sodium chloride	20·0	2·5*	6·0	1·5 0·5*	3·5 1·0*	3·75 1·0*	....	....
20% Protein Laying Pellets	129	do.	do.	do.	do.	do. do. do. do.	20·0	2·5*	6·0	2·0 0·5*	3·75 1·0*	3·75 1·0*	....	....
20% Protein Vitamised Laying Mash	130	do.	do.	do.	do.	Bran, pollard, grain meals, wheat germ, whale meal, dried whale solubles, whale solubles and/or meat meal, oyster flour, bone flour and/or ground phosphate, sodium chloride, lucerne meal, micratized vitamins A and D3	20·0	2·5*	6·0	1·5 0·5*	3·5 1·0*	3·75 1·0*	....	....
20% Protein Vitamised Laying Pellets	131	do.	do.	do.	do.	do. do. do. do.	20·0	2·5*	6·0	2·0 0·5*	3·75 1·0*	3·75 1·0*	....	....
13% Protein Vitamised Fattening Mash	132	do.	do.	do.	do.	Bran, pollard, grain meals, wheat germ, meat meal and/or whale meal, whale solubles, oyster flour, sodium chloride, micratized vitamins A and D3	13·0	2·0*	6·5	1·5 0·5*	3·5 1·0*	3·75 1·0*	....	....
13% Protein Vitamised Fattening Pellets	133	do.	do.	do.	do.	do. do. do. do.	13·0	2·0*	6·5	1·5 0·5*	3·5 1·0*	3·75 1·0*	....	....
Laying Mash	160	MORLAY	R. B. Young			Wheat meal, bran, pollard, whale meal, bone meal, meat meal, oyster flour and/or limestone, minerals	16·0	3·0*	5·5	2·0 0·75*	3·0 1·0*	4·0 2·0*	....	....
Laying Mash (Vitamin Fortified)	161	do.	do.			Wheat meal, bran, pollard, meat meal, whale meal, bone meal, oyster flour and/or limestone, minerals, vitamins A and D3	16·0	3·0*	5·5	2·0 0·75*	3·0 1·0*	4·0 2·0*	....	....
H.P. Laying Mash	162	do.	do.			Wheat meal, bran, pollard, meat meal, whale meal, whale solubles, bone meal, oyster flour and/or limestone, minerals	20·0	3·0*	5·5	2·0 0·75*	3·5 1·0*	4·0 2·0*	....	....
H.P. Laying Mash (Vitamin Fortified)	163	do.	do.			Wheat meal, bran, pollard, meat meal, bone meal, oyster flour and/or limestone, minerals, vitamins A and D3 whale meal	20·0	3·0*	5·5	2·0 0·75*	3·5 1·0*	4·0 2·0*	....	....
D Mash (Fattening)	164	do.	do.			Wheat meal, bran, pollard, meat meal, bone meal, minerals	11·0	3·0*	5·5	1·5 0·5*	3·0 1·0*	4·0 2·0*	....	....
Laying Mash	177	P.P.	Picton Produce Pty., Ltd.			Bran, pollard, wheat meal, oat meal, meat meal, bone meal, ground oyster flour, salt, vitamin A	14·0	3·0*	7·0	1·0 0·5*	2·5 0·5*	2·5 0·5*	....	....
5.—*Chick Foods.*												
Special Chick Starter	9	MAYCO	The Maylands Milling Co. Pty., Ltd.			Bran, pollard, wheat meal, meat meal, bone meal, shell grit, salt, riboflavin, emulsified fish oil	17·0	3·5*	5·0	1·0 0·75*	3·0 2·5*	3·5 3·0*	....	....
Growing Mash	10	do.	do.	do.	do.	do. do. do. do.	15·0	3·5*	5·0	1·0 0·75*	3·0 2·5*	3·5 3·0*	....	....

* Minimum.

STOCK FOODS—continued

Stock Food.	Reg. No.	Brand.	By whom Registered.	Materials from which Made.	Registered Analysis.						
					Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride. (NaCl).	Phosphoric Acid. (P_2O_5).	Calcium. (Ca).	Other.
					% (Min.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	
Chickfood	31	H. & C.	Haynes & Clements	Wheat, maize, peas, grit	9·0	1·5*	4·5	....	....	....	.
Chicken Food	44	ROYAL SEAL	J. & W. Bateman, Ltd.	Wheat, pannicum seed, peas, maize, shell grit	10·0	2·0*	4·0	0·5 *nil*	1·0 0·25*	6·0 3·0*	. ..
Starter Mash	49	VITALIZER	Barrow, Linton & Co.	Bran, pollard, wheat meal, meat meal, bone meal, shell grit, salt, riboflavin, emulsified fish oil	17·0	3·5*	5·0	1·0 0·75*	3·0 2·5*	3·5 3·0*	. . ..
Growing Mash .. .	50	GROWELL ...	do. do. ..	Bran, pollard, wheat meal, meat meal, bone meal, shell grit, salt, riboflavin, emulsified fish oil	15·0	3·5*	5·0	1·0 0·75*	3·0 2·5*	3·5 3·0*	....
Grain Food	51	CHIC CHIC	do. do.	Wheat, maize, peas, grit	9·0	1·5*	4·5	....	....	....	. .
Chick Mash A ..	73	WESFARMERS	Westralian Farmers Co-op., Ltd.	Bran, pollard, cracked wheat, oat meal, meat meal, buttermilk, bone meal	16·0	3·0*	7·0	1·0 *nil*	2·3 1·2*	1·3 0·8*	....
Chick Mash A (A & D3)	74	do.	do. do. do.	Bran, pollard, cracked wheat, oat meal, meat meal, buttermilk, bone meal, stabilised vitamins A and D3	16·0	3·0*	7·0	1·0 *nil*	2·3 1·2*	1·3 0·8*	....
Chick Pellets A	75	RED COMB	do. do. do.	Bran, pollard, cracked wheat, oat meal, meat meal, buttermilk, bone meal	16·0	3·0*	7·0	1·0 *nil*	2·3 1·2*	1·3 0·8*	.... ..
Chick Pellets A (A & D3)	76	do.	do. do. do.	Bran, pollard, cracked wheat, oat meal, meat meal, buttermilk, bone meal, stabilised vitamins A and D3	16·0	3·0*	7·0	1·0 *nil*	2·3 1·2*	1·3 0·8*	....
Chick Mash A	77	WESFARMERS "P"	do. do. do.	Bran, pollard, cracked wheat, oat meal, meat meal, buttermilk, bone meal, antibiotics	16·0	3·0*	7·0	1·0 *nil*	2·3 1·2*	1·3 0·8*	....
Chick Mash A (A & D3)	78	do.	do. do. do.	Bran, pollard, cracked wheat, oat meal, meat meal, buttermilk, bone meal, antibiotics, stabilised vitamins A and D3	16·0	3·0*	7·0	1·0 *nil*	2·3 1·2*	1·3 0·8*	.... ..
Chick Mash B	79	WESFARMERS	do. do. do.	Bran, pollard, rolled wheat, oat meal, meat meal, buttermilk, bone meal	15·0	3·0*	7·0	1·0 *nil*	2·3 1·2*	1·3 0·8*	....
Chick Mash B (A & D3)	80	do.	do. do. do.	Bran, pollard, rolled wheat, oat meal, meat meal, buttermilk, bone meal, stabilised vitamins A and D3	15·0	3·0*	7·0	1·0 *nil*	2·3 1·2*	1·3 0·8*	....
Chick Pellets B	81	RED COMB	do. do. do.	Bran, pollard, rolled wheat, oat meal, meat meal, buttermilk, bone meal	15·0	3·0*	7·0	1·0 *nil*	2·3 1·2*	1·3 0·8*	.... ..
Chick Pellets B (A & D3)	82	do.	do. do. do.	Bran, pollard, rolled wheat, oat meal, meat meal, buttermilk, bone meal, stabilised vitamins A and D3	15·0	3·0*	7·0	1·0 *nil*	2·3 1·2*	1·3 0·8*	.... .
Chick Mash B ...	83	WESFARMERS "P"	do. do. do.	Bran, pollard, rolled wheat, oat meal, meat meal, buttermilk, bone meal	15·0	3·0*	7·0	1·0 *nil*	2·3 1·2*	1·3 0·8*	.... .
Chick Mash B (A & D3)	84	do.	do. do. do.	Bran, pollard, rolled wheat, oat meal, meat meal, buttermilk, bone meal, stabilised vitamins A and D3	15·0	3·0*	7·0	1·0 *nil*	2·3 1·2*	1·3 0·8*	. ..
Growers' Mash	85	WESFARMERS	do. do. do.	Bran, pollard, rolled wheat, oat meal, meat meal, bone meal	14·0	3·0*	7·0	1·0 *nil*	2·3 1·2*	1·5 1·0*	. ....

Growers' Mash (A & D3)	86	do.	do.	Bran, pollard, rolled wheat, oat meal, meat meal, bone meal, stabilised vitamins A and D3	14·0	3·0*	7·0	1·0 *nil**	2·3 1·2■	1·5 1·0*	
Growers' Pellets	87	RED COMB	do.	Bran, pollard, rolled wheat, oat meal, meat meal, bone meal	14·0	3·0*	7·0	1·0 *nil**	2·3 1·2■	1·5 1·0*	
Growers' Pellets (A & D3)	88	do.	do.	Bran, pollard, rolled wheat, oat meal, meat meal, bone meal, stabilised vitamins A and D3	14·0	3·0*	7·0	1·0 *nil**	2·3 1·2■	1·5 1·0■	
Growers' Mash	89	WESFARMERS "P"	do.	Bran, pollard, rolled wheat, oat meal, meat meal, buttermilk, bone meal	14·0	3·0*	7·0	1·0 *nil**	2·3 1·2*	1·5 1·0*	
Growers' Mash (A & D3)	90	do.	do.	Bran, pollard, rolled wheat, oat meal, meat meal, buttermilk, bone meal, stabilised vitamins A and D3	14·0	3·0*	7·0	1·0 *nil**	2·3 1·2■	1·5 1·0■	
Chickstarter	106	MILLERS	W. H. Milne & Co.	Bran, pollard, wheat meal, meat meal, ribon, bone meal, gristed oats, salt, vitamins A and D3	16·0	3·0*	6·0	1·5 0·75*	3·0 1·0■	3·5 1·0*	
Chickbuilder	107	do.	do.	Bran, pollard, wheat meal, bone meal, meat meal, gristed oats, salt, vitamins A and D3	15·0	3·0*	6·0	1·5 0·75*	3·0 1·0■	3·5 1·0■	
Chick Food	110	PARSONS	Parsons Bros. & Co. Pty., Ltd.	Wheat, green peas, maize, sorghum seed, shell grit	8·0	0·5*	4·5	0·5 *nil**	1·0 0·5■	4·0 3·0*	
18% Protein Antibiotic Vitamised Chick Starter	134	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Bran, pollard, cereal meals, wheat germ, meat meal and /or whale meal, whale solubles, lucerne pollard, pea meal, bone flour and /or ground phosphate, oyster flour, riboflavin, procain penicillin, micratized vitamins A and D3	18·0	2·5*	6·0	1·5 0·25*	3·0 1·0■	2·5 1·0*	
18% Protein Antibiotic Vitamised Chick Granules	135	do.	do.	do. do. do. do.	18·0	2·5*	6·0	1·5 0·25*	3·0 1·0*	2·5 1·0*	
15% Protein Vitamised Chick Grower	136	do.	do.	Bran, pollard, grain meals, wheat germ, meat meal and /or whale meal, whale solubles and /or dried whale solubles, bone flour and /or ground phosphate, oyster flour, sodium chloride, micratized vitamins A and D3	15·0	2·5*	6·0	1·25 0·5*	3·5 1·0*	3·75 0·5*	
15% Protein Vitamised Growers' Pellets	137	do.	do.	do. do. do. do.	15·0	2·5*	6·0	1·25 0·5*	3·5 1·0*	3·75 0·5*	
Chicken Grain	138	do.	do.	Wheat, maize, peas, shell grit	9·0	1·5*	4·5				
No. 1 Chick Food	147	ANCHOR	G. Wood Son & Co. (W.A.) Pty., Ltd.	Peas, barley, wheat, maize, linseed, whale meal, bone grit, fine shell grit	16·0	1·5*	6·0	0·2 0·02*	2·0 0·5*	6·0 2·0*	
Chick Starter	165	MORLAY	R. B. Young	Wheat meal, bran, meat meal, whale meal, bone meal, buttermilk powder, shell grit, riboflavin, minerals, vitamins A and D3	18·0	3·0*	5·5	1·75 0·75*	3·5 1·0*	4·0 2·0*	
Chick Allmash	166	do.	do.	Wheat meal, bran, meat meal, whale meal, bone meal, shell grit, riboflavin, minerals, vitamins A and D3	15·0	3·0*	6·0	1·75 0·75*	3·0 1·0*	4·0 2·0*	
Growing Mash	167	do.	do.	Wheat meal, bran, pollard, meat meal, whale meal, bone meal, oyster shell flour and /or limestone, riboflavin, minerals	14·0	3·0*	5·5	2·0 0·75*	3·0 1·0*	5·0 2·5*	
Growing Mash (Vitamin Fortified)	168	do.	do.	Wheat meal, bran, pollard, meat meal and /or whale meal, bone meal, oyster shell flour, riboflavin, minerals, vitamins A and D3	14·0	3·0*	5·5	2·0 0·75*	3·0 1·0*	5·0 2·5*	

* Minimum.

Stock Food.	Reg. No.	Brand.	By whom Registered.	Materials from which Made.	Registered Analysis.						
					Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride (NaCl).	Phosphoric Acid (P_2O_5).	Calcium (Ca).	Other.
					% (Min.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	
Chick Starter	178	P.P.	Picton Produce Pty., Ltd.	Bran, pollard, oat meal, meat meal, liver meal, bone meal, buttermilk, vitamins A and D3, trace elements (copper and manganese)	16·0	2·5*	5·0	1·0 0·5*	2·5 1·5*	2·5 1·5*	
6.—Pig Foods.											
Pig Food	14	EVE-LYN	Tropical Traders & Patersons, Ltd.	Pollard, salt, limestone, chalk, sulphur, charcoal, sulphate of iron, limonite, copper sulphate, gristed wheat, ginger, coriander, areca nut, foenugreek, barley meal, rye meal	5·0	1·0*	5·0	9·6 8·6*	3·75 3·25*	9·5 8·5*	Sulphur 3·25 (max.)
Pig Mash	91	WESFARMERS	Westralian Farmers Co-op., Ltd.	Bran, pollard, rolled wheat, meat meal, bone meal, limestone, copper	16·0	5·0*	8·0	2·0 1·0*	3·5 2·3*	2·5 2·0*	....
Pig Fattening Mash	92	do.	do. do. do.	Bran, pollard, rolled wheat, meat meal	13·0	4·0*	8·0	2·0 1·0*	1·2 0·7*	1·0 0·5*	....
18% Protein Antibiotic Vitamised Pig Starter	139	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Pollard, wheat germ, grain meals, meat meal and/or whale meal, dried whale solubles, whale solubles, bone flour and/or ground phosphate, oyster flour, sodium chloride, procaine penicillin, micratized vitamins A and D3, manganese sulphate, stabilised iodine, cobalt sulphate, riboflavin	18·0	2·5*	6·5*	2·0 1·0*	3·75 1·0*	4·0 1·0*	Manganese 60 p.p.m. Iodine 1·2 p.p.m. Cobalt 3 p.p.m.
18% Protein Antibiotic Vitamised Pig Starter Pellets	140	do.	do. do. do.	Pollard, grain meals, meat meal and/or whale meal, dried whale solubles, whale solubles, bone flour and/or ground phosphate, oyster flour, sodium chloride, riboflavin, procaine penicillin, micratized vitamins A and D3, manganese sulphate, stabilised iodine, cobalt sulphate	18·0	2·5*	6·5	2·0 1·0*	3·75 1·0*	4·0 1·0*	Manganese 60 p.p.m. Iodine 1·2 p.p.m. Cobalt 3 p.p.m.
16% Protein Antibiotic Vitamised Pig Grower	141	do.	do. do. do.	Pollard, grain meals, meat meal and/or whale meal, dried whale solubles, whale solubles, bone flour and/or ground phosphate, oyster flour, sodium chloride, procaine penicillin, micratized vitamins A and D3, manganese sulphate, stabilised iodine, cobalt sulphate	16·0	2·5*	6·5	2·0 1·0*	3·5 1·0*	4·5 1·0*	Manganese 60 p.p.m. Iodine 1·2 p.p.m. Cobalt 3 p.p.m
16% Protein Antibiotic Vitamised Pig Grower Cubes	142	do.	do. do. do.	do. do. do. do.	16·0	2·5*	6·5	2·0 1·0*	3·5 1·0*	4·5 1·0*	Manganese 60 p.p.m. Iodine 1·2 p.p.m. Cobalt 3 p.p.m.

14% Protein Pig Fattening Mash	143	do.	do.	do.	do.	Pollard, grain meals, dried whale solubles, meat meal and/or whale solubles, bone flour and/or ground phosphate, oyster flour, sodium chloride, manganese sulphate, stabilised iodine, cobalt sulphate	14·0	2·5*	6·5	2·0 1·0*	3·75 1·0*	4·0 1·0*	Manganese 60 p.p.m. Iodine 1·2 p.p.m.	Cobalt 3 p.p.m.
14% Protein Pig Fattening Cubes	144	do.	do.	do.	do.	Pollard, grain meal, whale meal and/or meat meal, dried whale solubles, whale solubles, bone flour and/or ground phosphate, oyster flour, sodium chloride, manganese sulphate, stabilised iodine, cobalt sulphate	14·0	2·5	6·5	2·0 1·0*	3·75 1·0*	4·0 1·0*	Manganese 60 p.p.m. Iodine 1·2 p.p.m.	Cobalt 3 p.p.m.
Pig Mash	169	MORLAY ..	R. B. Young . ..			Wheat meal, pollard, barley meal, meat meal, whale meal, whale solubles, limestone, minerals	14·0	3·0*	6·0	2·0 0·75*	3·0 1·0*	4·0 2·0*	....	....
Pig Mash (Vitamin Fortified)	170	do.	do.	....	....	Wheat meal, pollard, barley meal, meat meal, whale meal, whale solubles, limestone, minerals, vitamins A and D3	14·0	3·0*	6·0	2·0 0·75*	3·0 1·0*	4·0 2·0*	....	....
Pig Mash H.P.	171	do.	do.	....	....	Wheat meal, pollard, barley meal, meat meal, whale meal, whale solubles, limestone, minerals	17·0	3·0*	6·0	2·0 0·75*	3·5 1·0*	4·0 2·0*	....	....
Pig Mash H.P. (Vitamin Fortified)	172	do.	do.	....	....	Wheat meal, pollard, barley meal and/or oatmeal, meat meal, whale meal, whale solubles, limestone, minerals, vitamins A and D3	17·0	3·0*	6·0	2·0 0·75*	3·5 1·0*	4·0 2·0*	....	....
Pig Food	179	P.P.	Picton Produce Pty., Ltd.			Barley meal, oat meal, linseed, bone meal, meat meal, ground lime, salt	15·0	4·0*	7·0	1·5 0·5*	2·0 0·5*	2·0 0·5*	....	....
7.—*Horse Foods.*												
Horse Food	15	EVE-LYN	Tropical Traders & Patersons, Ltd.			Pollard, linseed (whole), wheat, salt, chalk, magnesium sulphate, sulphur, sulphate of iron, copper sulphate, sodium bicarbonate, foenugreek, aniseed, turmeric, cream of tartar, gentian, ginger, peruvian bark, areca nut, coriander, powdered liquorice root, bole armenian, barley meal, rye meal	8·5	2·0*	7·0	5·5 4·5*	1·0 0·5*	1·75 0·75*	Sulphur 1·25 (max.)	....
12% Protein Sweet Horse Food	145	THOMAS	W. Thomas & Co. (W.A.), Ltd.			Mill offal, grain meals, molasses, brewers grains, malt combings, bone flour and/or ground phosphate, oyster flour, sodium chloride, manganese sulphate, stabilised iodine, cobalt sulphate	12·0	1·5*	10·0	2·0 1·0*	2·5 1·0*	4·0 1·0*	Manganese 60 p.p.m. Iodine 1·2 p.p.m.	Cobalt 3 p.p.m.
8.—*Dog Foods.*												
No. 1 Dog Biscuits	16	SNAPS .	A. E. Robinson			Wheat, bone, meat, vegetable	15·0	4·0*	2·0	0·7 0·4*	4·5 3·0*	4·5 3·5*	....	....
Plain Shapes	17	do.	do.	do.	....	do. do. do. do.	15·0	4·0*	2·0	0·7 0·4*	4·0 3·0*	4·0 3·0*	....	....
Charcoal Shapes	18	do.	do.	do.	....	do. do. do. do.	14·0	3·0*	6·0	0·7 0·4*	3·0 2·0*	3·0 2·0*	....	....
Puppy Meal	19	do.	do.	do.	....	do. do. do. do.	15·0	4·0*	2·0	0·6 0·3*	4·0 3·0*	4·5 3·5*	.. ..	....
9.—*Miscellaneous.*												
Lin Meal	155	WESTERN	David Gray & Co., Ltd.			Malt grains, linseed, peanut meal, yeast, bone meal, traces of cobalt chloride, copper sulphate, manganese sulphate	18·0	5·0*	7·5	1·5 0·5*	1·5 0·5*	1·0 0·15	.	....

* Minimum.

Stock Food.	Reg. No.	Brand.	By whom Registered.	Materials from which Made.	Registered Analysis.						
					Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride. (NaCl).	Phosphoric Acid. (P_2O_5).	Calcium. (Ca).	Other.
					% (Min.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	
C.—Stock Licks.											
1.—Bone Meals.										Lime (CaO)	
Bone Meal	6	ANCHO	Anchorage Butchers Pty., Ltd.	Waste meat products	23·63	2·44	trace	trace	26·76*	26·95*	
Do.	7	C.H.B.	C. H. Bailey	Pig bones	12·0			1·0	28·0*	30·0*	
Sterilized Bone Flour	83	TRI-CAL-OS	Davis Gelatine (Aust.) Pty., Ltd.	Bones	5·0			....	30·0*	40·0*	....
Sterilized Bone Grit	84	WRIGHT'S	do. do. do.	do.	5·0			....	30·0*	40·0*	....
Whale Bone Meal	46	W.A.M.E.	Wrights, Ltd.	Whalebone	8·5			1·0	30·0*	28·0*	....
Bone Meal	53		The W.A. Meat Export Works	Bones	13·75			0·25	26·0*	27·0*	....
Do.	180	P.P.	Picton Produce Pty., Ltd.	Sterilised bone	20·0			0·25	24·0*	27·0*	....
2.—Oyster Flours.											
Oyster Flour	148	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Oyster shell				1·0	*nil**	42·0*	....
Do.	143	DEAN'S	J. Deane & Son	do.				0·5	trace*	50·0*	....

* Minimum.

'CUPROX'★

The ready to use copper oxychloride fungicidal spray — Prepared by simply adding to water.

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A new and outstanding organic fungicidal spray for fruit trees and vines — harmless to fruit, flowers or foliage.

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A high-grade lime sulphur (available only in N.S.W. and Q'land).

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SAG.26W.4699

DEPENDABLE PLANT PROTECTION PRODUCTS

IMPERIAL CHEMICAL INDUSTRIES OF AUSTRALIA & NEW ZEALAND LTD.

STOCK FOODS—continued

Stock Food.	Reg. No.	Brand.	By Whom Registered.	Materials from which Made.	Registered Analysis.											
					Sodium Chloride ($NaCl$).	Phosphoric Acid (P_2O_5).	Lime (CaO).	Magnesia (MgO).	Iron (Fe).	Sulphur (S).	Iodine (I).	Copper (Cu).	Cobalt (Co).	Manganese (Mn).	Potassium (K).	Zinc (Zn).
3.—*Mixed Stock Licks.*					% (Max.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)
Cattle Lick	21	BOVEX	Chemex Products ..	Common salt, rock phosphate, cobalt chloride, copper sulphate, manganese sulphate, iron oxide, zinc oxide	75·0	4·0	10·0	....	0·78	0·06	....	0·06	0·01	0·05	....	0·16
Sheep Lick	22	OVEX	do. do.	do. do. do.	60·0	4·0	10·0	....	0·78	0·10	....	0·06	0·075	0·06	....	0·20
Min-a-vit	26	BLACK BAND	Hamilcar Holdings Pty., Ltd.	Bone flour, calcium carbonate, manganese sulphate, iron oxide, potassium iodide, sodium chloride, cobalt sulphate, copper sulphate, vitamin D3 (mineral stable)	15·0	27·0	40·0	....	0·077	....	0·03	0·002	0·002	0·42	....	....
Do.	27	ORANGE BAND	do. do.	Bone dust, talc, whiting, salt, molasses, copper sulphate, zinc sulphate, manganese sulphate, cobalt sulphate, iron oxide, potassium iodide, vitamin concentrate (mineral stable vitamin D3)	21·0	18·0	22·0	2·0	0·022	...	0·043	0·025	0·009	0·032	Crude Protein 3·0	0·022
Do.	28	RED BAND	do. do.	do. do. do.	16·0	12·0	18·0	6·0	0·625	....	0·043	0·025	0·009	0·032	Crude Protein 2·0	0·022
Iodised Mineral Lick	29	DAY SON & HEWITT, LTD.	Boans, Ltd.	Limestone flour, sterilised feeding bone flour, sodium chloride, iron sulphate, ferric oxide, sulphur, potassium iodide	83·7	1·72	5·5	..	0·87	0·49	0·03	....	....	....	0·01	....
Tra-ca-phene "B"	35	BLUE PETER	Agricultural Products Co.	Phenothiazine, ground limestone, limonite, copper carbonate, cobalt sulphate, manganese oxide	1·0		32·0	...	2·9	.	.	1200 p.p.m.	225 p.p.m.	500 p.p.m.	Phenothiazine 19·0	....
Medicated Calcium	36	do. .	do. do.	Ground limestone, limonite, copper carbonate, cobalt sulphate, manganese oxide	1·0	..	45·0	.	3·5		....	1500 p.p.m.	285 p.p.m.	600 p.p.m.	....	....
Medicated Salt Block "B"	37	do.	do. do.	Salt, ground limestone, limonite, copper carbonate, cobalt sulphate, manganese oxide	70·0	....	6·0	.	1·5	...	....	550 p.p.m.	95 p.p.m.	200 p.p.m.	....	....
Denmark Cobalt Lick	42	C.S.M.L.	Cuming Smith & Mt. Lyell F.F., Ltd.	Limonite, sulphate of copper, salt	38·0	.			20·0	. .	...	0·14	20 p.p.m.	..	...	...

* Minimum.

STOCK FOODS—continued

Stock Food.	Reg. No.	Brand.	By Whom Registered.	Materials from which Made.	Registered Analysis.											
					Sodium Chloride ($NaCl$).	Phosphoric Acid (P_2O_5).	Lime (CaO).	Magnesia (MgO).	Iron (Fe).	Sulphur (S).	Iodine (I).	Copper (Cu).	Cobalt (Co).	Manganese (Mn).	Potassium (K).	Zinc (Zn).
					% (Max.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)
Cattle Lick	93	WESFARMERS	Westralian Farmers Co-op., Ltd.	Bone meal, common salt, yeast, iron sulphate, copper sulphate, cobalt chloride, manganese sulphate, potassium iodide, sulphur, zinc sulphate	80·0	1·0	5·0		1·2	3·3	150 p.p.m.	220 p.p.m.	92 p.p.m.	200 p.p.m.	50 p.p.m.	80 p.p.m.
Sheep Lick	94	do.	do. do.	do. do. do.	80·0	1·0	5·0		1·2	3·3	150 p.p.m.	220 p.p.m.	92 p.p.m.	200 p.p.m.	50 p.p.m.	80 p.p.m.
Concentrated Cattle Lick	97	VITA-LICK	Goldsbrough Mort & Co., Ltd.	Bone flour (degelatinised), bone charcoal, sodium sulphate (anhydrous), flowers of sulphur, limonite, potassium iodide, copper sulphate, cobalt chloride	*nil*	28·2	36·1		3·5	0·45	0·034	0·2	0·014	..	....	....
Concentrated "D"	98	do.	do. do.	Bone flour (degelatinised), bone charcoal, sodium sulphate (anhydrous), sulphur, limonite, potassium iodide	*nil*	30·0	38·75		2·25	2·0	0·034				....	....
Concentrated "D" (Cobaltised and Copperised)	99	do.	do. do.	Bone flour (degelatinised), bone charcoal, sodium sulphate (anhydrous), sulphur, limonite, potassium iodide, cobalt chloride, copper sulphate	*nil*	30·0	38·75		2·25	2·0	0·034	0·2	0·014	....	....	....
Concentrated "G"	100	do.	do. do.	Bone flour (degelatinised), bone charcoal, limonite, flowers of sulphur, potassium iodide	*nil*	28·75	37·0		7·25	2·0	0·034		..	....	....	....
Concentrated "G" (Cobaltised and Copperised)	101	do.	do. do.	Bone flour (degelatinised), bone charcoal, limonite, flowers of sulphur, potassium iodide, copper sulphate, cobalt chloride	*nil*	28·75	37·0		7·25	2·0	0·034	0·2	0·014	....	....	....
Mineral Supplement for Pigs	102	POR-CO-VITE	do. do.	Bone flour (degelatinised), bone charcoal, sodium sulphate (anhydrous), flowers of sulphur, sodium chloride, limonite, calcium carbonate, copper sulphate, cobalt chloride, potassium iodide	14·0	19·14	29·32		0·62	9·6	0·052	0·1	0·003	....	....	....
Concentrated Cattle Lick	111	VIC-LIC	Wilcox Mofflin, Ltd.	Precipitated bone, di-calcic phosphate, bone char, iron limonite, salt, potassium iodide	5·5	29·0	39·0		2·9	..	..		..	..	....	....
Concentrated Sheep Lick	112	VIC-LIC "D"	do. do.	Precipitated bone, di-calcic phosphate, bone char, iron limonite, sodium sulphate, copper sulphate, cobalt chloride, potassium iodide	*nil*	30·0	41·0		2·9	..	..	0·75	0·031	....	....	....
Do. do.	113	VIC-LIC "G"	do. do.	Bone char, iron limonite, potassium iodide, copper sulphate, cobalt	*nil*	28·0	37·0		5·8		....	0·78	0·07	..	....	....

Mineralised Salt Block	114	VIC-LIC ..	do.	do.	Salt, bone char, iron limonite, epsom salts, molasses, potassium iodide	53·0	4·5	19·5	0·16	1·25	....	.	.	....	....	....	....
Mineral Concentrate	151	VETSOLICK .	A. H. McDonald & Co.		Magnesium sulphate, sodium bicarbonate, carbo-ligni, iron sulphate, sulphur, potassium iodide, bone meal, wheat meal	*nil*	11·0	14·0	0·7	1·5	16·6	.	. .	.. .	. .	....	....
Medicated Lick	152	VETAMAC	do.	do.	Salt, iron sulphate, sodium bicarbonate, aloes, sulphur, magnesium sulphate, bone meal, molasses, potassium iodide, wheat meal	53·0	5·7	7·5	0·1	0·7	4·0	....	....	....	....	....	....
Cattle Lick ..	156	DAVID GRAY'S	David Gray & Co., Ltd.		Sodium chloride, iron sulphate, copper sulphate, cobalt chloride, manganese sulphate, potassium iodide, bone meal, yeast	80·0	1·0	5·0	....	1·2	3·3	150 p.p.m.	220 p.p.m.	92 p.p.m.	200 p.p.m.	50 p.p.m.	80 p.p.m.
Sheep Lick	157	do. do.	do.	do.	do. do. do.	80·0	1·0	5·0		1·2	3·3	150 p.p.m.	220 p.p.m.	92 p.p.m.	200 p.p.m.	50 p.p.m.	80 p.p.m.
Mineralized Supplement for Stock	158	RAWLEIGH'S	The W. T. Rawleigh Co., Ltd.		Sodium chloride, sulphur, copperas (iron sulphate), sodium phosphate, potassium iodide, calcium carbonate, cobalt sulphate, defluorinated phosphate, mineral oil, molasses, medicants	15·0	12·24	26·99	.. ..	1·03	3·5	trace	....	trace	....	trace	....
Poultry Powder (Iodized)	159	do. do.	do.	do.	Oyster shell, sulphur, potassium iodide, ground bone, copperas (iron sulphate), manganese sulphate, copper sulphate, zinc sulphate, cobalt sulphate, quassia, calcium carbonate, defluorinated phosphate, mineral oil	...	16·68	38·74	.. .	0·39	4·0	trace	trace	trace	trace	trace	trace
Dairy Lick	181	P.P.	Picton Produce Pty., Ltd.		Common salt, lime, calcium, phosphate, copper sulphate, manganese sulphate, zinc sulphate, cobalt chloride, iron	75·0	3·0	10·0	.. .	trace	..	...	trace	trace	trace	....	trace

* Minimum.

ANALYSES OF STOCK FOODS

RESULTS OF ANALYSES OF SAMPLES OF STOCK FOODS TAKEN UNDER THE FEEDING STUFFS ACT, 1928-1951. PERIOD 1/6/53—30/5/54

(Published under section 9 of the Act)

Date Sample Taken.	Firm and Brand.	Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride ($NaCl$)	Phosphoric Acid (P_2O_5).	Calcium (Ca).	Other.
		%	%	%	%	%	%	%
	Agricultural Products Co.							
	"Blue Peter" Medicated Calcium Concentrate—							
	Registered Analysis	Iron (Fe) 3·5†	Sulphur (S) 2·0†	Magnesia (MgO) 0·5†	*nil**	4·0†	Lime (CaO) 45·0†	
		Zinc (Zn) 240† p.p.m.	Copper (Cu) 1500† p.p.m.	Iodine (I) 450† p.p.m.	Manganese (Mn) 600† p.p.m.	Potassium (K) 137† p.p.m.	Cobalt (Co) 285† p.p.m.	....
12–11–53	Sample Analysis	Iron (Fe) 0·7	Sulphur (S) 0·2	Magnesia (MgO) 2·2	0·10	0·11	Lime (CaO) 48·8	....
		Zinc (Zn) 180 p.p.m.	Copper (Cu) 1079 p.p.m.	Iodine (I) 59 p.p.m.	Manganese (Mn) 144 p.p.m.	Potassium (K) 39 p.p.m.	Cobalt (Co) 95 p.p.m.	..
	"Blue Peter" Tra-ca-phene Concentrate—							
	Registered Analysis	Iron (Fe) 1·5†	Sulphur (S) 2·0†	Magnesia (MgO) 0·5†	*nil**	4·0†	Lime (CaO) 36·4†	Phenothiazine 19·0†
		Zinc (Zn) 240† p.p.m.	Copper (Cu) 1500† p.p.m.	Iodine (I) 450† p.p.m.	Manganese (Mn) 600† p.p.m.	Potassium (K) 137† p.p.m.	Cobalt (Co) 285† p.p.m.	....
12–11–53	Sample Analysis	Iron (Fe) 0·6	Sulphur (S) 1·3	Magnesia (MgO) 1·9	0·73	0·09	Lime (CaO) 39·6	Phenothiazine 9·7
		Zinc (Zn) 225 p.p.m.	Copper (Cu) 1143 p.p.m.	Iodine (I) 111 p.p.m.	Manganese (Mn) 2192 p.p.m.	Potassium (K) 38 p.p.m.	Cobalt (Co) 60 p.p.m.	
	Anchorage Butchers Pty., Ltd.							
	"Coogee" Meat Meal—							
	Registered Analysis	36·9†	18·6*	1·3*	1·0*	12·73*	12·5* / 8·0†	
29–10–53	Sample Analysis	43·7	17·3	1·3	0·61	11·3	10·1	..
	"Ancho" Bone Meal—						Lime (CaO)	
	Registered Analysis	23·63†	2·44†	trace	trace	26·76†	26·95†	..
29–10–53	Sample Analysis	23·0	3·0	0·5	0·08	27·5	30·2	.
	"Coogee" Meat Meal—							
	Registered Analysis	36·9†	18·6*	1·3*	1·0*	12·73*	12·5* / 8·0†	....
18–5–54	Sample Analysis .	37·6	16·4	1·2	0·66	11·0	10·2	...
	W. Angliss & Co. (Aust.) Pty., Ltd.							
	"Imperial" Protein Meat and Bone Meal—							
	Registered Analysis	50·0†	16·0*	2·0*	.		.	
3–9–53	Sample Analysis	49·5	10·9	1·2				
	Australian Whaling Commission.							
	"Australian Whaling Commission" Whale Meal—							
	Registered Analysis	60·0†	10·0*	1·0*	0·6* / 0·3†	10·5* / 8·5†	9·5* / 7·5†	...
14–8–53	Sample Analysis	59·5	9·7	0·51	0·67	9·04	7·69	
	"Australian Whaling Commission" Whale Meal—							
	Registered Analysis	60·0†	10·0*	1·0*	0·6* / 0·3†	10·5* / 8·5†	9·5* / 7·5†	
29–10–53	Sample Analysis	60·6	12·4	0·4	0·74	6·85	6·02	
	Barrow, Linton & Co.							
	"Eggiayer" Laying Mash—							
	Registered Analysis	17·0†	3·5†	5·0*	1·0* / 0·75†	3·0* / 2·5†	3·5* / 3·0†	

* Maximum. † Minimum.

ANALYSES OF STOCK FOODS—continued

Date Sample Taken.	Firm and Brand.	Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride (NaCl)	Phosphoric Acid (P_2O_5).	Calcium (Ca).	Other.
		%	%	%	%	%	%	%
	Barrow Linton & Co.—continued							
6–8–53	Sample Analysis	18·4	4·8	4·8	0·85	3·53	3·04	....
	"Vitalizer" Starter Mash—							
	Registered Analysis	17·0†	3·5†	5·0*	1·0* 0·75†	3·0* 2·5†	3·5* 3·0†	....
6–8–53	Sample Analysis	16·5	3·5	5·0	0·90	2·40	2·54	....
	"Dukko" Fattening Mash—							
	Registered Analysis	15·0†	3·5†	5·0*	1·0* 0·75†	3·0* 2·5†	3·5* 3·0†	....
19–3–54	Sample Analysis	14·5	3·6	5·8	0·73	2·6	2·4	....
	"Gro-well" Growing Mash—							
	Registered Analysis	15·0†	3·5†	5·0*	1·0* 0·75†	3·0* 2·5†	3·5* 3·0†	....
23–3–54	Sample Analysis	14·8	3·8	5·8	0·69	2·6	2·37	....
	Burridge & Warren Pty., Ltd.							
	"Pannifex" Feeding Meat Meal—							
	Registered Analysis	55·0†	13·0*	3·0*	....	....	....	....
3–9–53	Sample Analysis	49·5	8·8	2·5	....	....	....	....
	"Master" Meat Meal—							
	Registered Analysis	40·0†	13·0*	5·0*	....	....	....	....
9–2–54	Sample Analysis	44·3	10·6	2·0	....	....	....	....
	Cheynes Beach Whaling Co. Pty., Ltd.							
	"Cheynes Beach" Whale Meal—							
	Registered Analysis	46·0†	23·5*	0·6*	0·73†	7·17†	6·03†	....
3–9–53	Sample Analysis	52·5	17·4	0·4	0·81	7·35	6·29	....
	Elder, Smith & Co., Ltd.							
	"MAB" Meat and Bone Meal—							
	Registered Analysis	50·0†	17·0* 11·0†	2·0*	....	....	....	....
1–9–53	Sample Analysis	53·4	11·2	1·9	....	....	....	....
	"Meggitt's" Pure Linseed Oil Meal—							
	Registered Analysis	30·0†	3·5†	10·0*	....	....	....	....
3–9–53	Sample Analysis	30·3	6·9	8·1	....	....	....	....
	E. J. Fry Pty., Ltd.							
	"Apex" Laying Mash—							
	Registered Analysis	16·0†	3·0†	6·0*	*nil*	2·0* 1·1†	3·0* 2·3†	....
31–8–53	Sample Analysis	16·0	3·1	4·0	0·31	2·88	2·65	....
	"Apex" Bone and Meat Meal—							
	Registered Analysis	37·0†	7·0*	1·5*	*nil*	15·0* 5·0†	15·0* 5·0†	....
31–8–53	Sample Analysis	37·7	11·3	1·9	0·80	14·3	14·2	....
	David Gray & Co., Ltd.							
	"Western" Calf Food—							
	Registered Analysis	18·0†	6·0†	7·5*	1·5* 0·5†	1·5* 0·5†	1·0* 0·15†	....
21–8–53	Sample Analysis	22·4	6·3	7·3	1·45	1·21	0·16	....
	"Western" Calf Food—							
	Registered Analysis	18·0†	6·0†	7·5*	1·5* 0·5†	1·5* 0·5†	1·0* 0·15†	....
4–2–54	Sample Analysis	20·9	8·1	6·8	1·96	1·20	0·36	....
	"Western" Lin Meal—							
	Registered Analysis	18·0†	5·0†	5·0*	1·5* 0·5†	1·5* 0·5†	1·0* 0·15†	....
4–2–54	Sample Analysis	20·5	6·9	6·2	2·64	1·17	0·33	....
	"Western" Calf Food—							
	Registered Analysis	18·0†	6·0†	7·5*	1·5* 0·5†	1·5* 0·5†	1·0* 0·15†	....
29–4–54	Sample Analysis	21·4	6·6	6·2	1·30	1·38	0·27	....
	C. A. Kirkby & Sons.							
	"Pennell's" Meat and Bone Meal—							
	Registered Analysis	50·0†	12·0*	4·0*	1·2* 0·5†	14·0* 10·0†	12·0†	....
28–1–54	Sample Analysis	52·0	6·9	1·2	1·2	12·4	11·6	....
	"KB" Laying Mash—							
	Registered Analysis	18·0†	3·5†	7·0*	1·5* 1·0†	2·0* 1·2†	4·0* 1·9†	....
28–1–54	Sample Analysis	17·8	4·3	6·7	1·5	3·26	5·0	....

* Maximum. † Minimum.

Date Sample Taken.	Firm and Brand.	Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride ($NaCl$)	Phosphoric Acid (P_2O_5).	Calcium (Ca).	Other.
	C. A. Kirkby & Sons—continued	%	%	%	%	%	%	%
	"KB" Laying Mash—							
	Registered Analysis	18·0†	3·5†	7·0*	1·5* 1·0†	2·0* 1·2†	4·0* 1·9†	....
13–5–54	Sample Analysis	19·4	4·6	5·8	0·34	3·87	4·93	....
	"Pennell's" Meat and Bone Meal—							
	Registered Analysis	50·0†	12·0*	4·0*	1·2* 0·5†	14·0* 10·0†	12·0†	....
13–5–54	Sample Analysis	52·9	7·9	0·8	0·93	11·4	10·1	....
	J. Kitchen & Sons.							
	"Kitchen's" Bone and Meat Meal—							
	Registered Analysis	42·5†	10·0*	2·5*	1·5* *nil*†	18·0* 13·0†	15·2* 11·0†	....
8–9–53	Sample Analysis	44·2	10·1	0·8	1·07	14·3	13·0	
	"Kitchen's" Bone and Meat Meal—							
	Registered Analysis	42·5†	10·0*	2·5*	1·5* *nil*†	18·0* 13·0†	15·2* 11·0†	....
29–4–54	Sample Analysis	43·1	10·0	1·1	0·89	15·1	14·4	....
	"Kitchen's" Bone and Meat Meal—							
	Registered Analysis	42·5†	10·0*	2·5*	1·5* *nil*†	18·0* 13·0†	15·2* 11·0†	....
18–5–54	Sample Analysis	42·9	9·9	0·7	0·70	16·0	14·8	....
	The Maylands Milling Co.							
	"Mayco" Special Laying Mash—							
	Registered Analysis	17·0†	3·5†	5·0*	1·0* 0·75†	3·0* 2·5†	3·5* 3·0†	....
1–9–53	Sample Analysis	17·7	4·0	4·4	1·13	3·15	3·46	....
	"Mayco" Special Chick Starter—							
	Registered Analysis	17·0†	3·5†	5·0*	1·0* 0·75†	3·0* 2·5†	3·5* 3·0†	....
10–9–53	Sample Analysis	16·9	3·9	4·0	1·01	3·0	3·14	....
	"Mayco" Growing Mash—							
	Registered Analysis	15·0†	3·5†	5·0*	1·0* 0·75†	3·0* 2·5†	3·5* 3·0†	....
10–9–53	Sample Analysis	17·2	3·9	4·0	1·04	3·09	3·13	....
	"Mayco" Growing Mash—							
	Registered Analysis	15·0†	3·5†	5·0*	1·0* 0·75†	3·0* 2·5†	3·5* 2·0†	....
12–11–53	Sample Analysis	16·6	4·3	4·2	0·99	3·22	2·87	....
	"Mayco" Special Laying Mash—							
	Registered Analysis	17·0†	3·5†	5·0*	1·0* 0·75†	3·0* 2·5†	3·5* 3·0†	....
19–3–54	Sample Analysis	17·6	4·4	5·5	0·77	4·1	4·0	....
	"Mayco" Special Laying Mash—							
	Registered Analysis	17·0†	3·5†	5·0*	1·0* 0·75†	3·0* 2·5†	3·5* 3·0†	....
8–4–54	Sample Analysis	18·6	4·0	3·9	1·41	3·48	3·50	....
	"Mayco" Special Laying Mash—							
	Registered Analysis	17·0†	3·5†	5·0*	1·0* 0·75†	3·0* 2·5†	3·5* 3·0†	....
13–5–54	Sample Analysis	17·0	3·7	4·4	0·97	3·03	3·41	....
	W. H. Milne & Co.							
	"Miller's" Laying Mash No. 1—							
	Registered Analysis	16·0†	3·0†	6·0*	1·5* 0·75†	3·0* 1·0†	3·5* 1·0†	....
1–9–53	Sample Analysis	17·4	5·7	6·0	0·78	2·25	2·41	....
	"Miller's" Chick Starter—							
	Registered Analysis	16·0†	3·0†	6·0*	1·5* 0·75†	3·0* 1·0†	3·5* 1·0†	....
16–9–53	Sample Analysis	17·5	4·6	5·3	0·84	2·83	2·40	....
	"Miller's" Chick Builder—							
	Registered Analysis	15·0†	3·0†	6·0*	1·5* 0·75†	3·0* 1·0†	3·5* 1·0†	....
16–9–53	Sample Analysis	15·8	4·6	5·5	0·69	2·28	1·78	....
	"Miller's" Chick Builder—							
	Registered Analysis	15·0†	3·0†	6·0*	1·5* 0·75†	3·0* 1·0†	3·5* 1·0†	....
22–4–54	Sample Analysis	16·8	4·1	5·9	1·25	1·21	2·27	....

* Maximum. † Minimum.

ANALYSES OF STOCK FOODS—continued

Date Sample Taken.	Firm and Brand.	Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride (NaCl)	Phosphoric Acid (P_2O_5).	Calcium (Ca).	Other.
	W. H. Milne & Co.—continued	%	%	%	%	%	%	%
	"Miller's" Laying Mash No. 1—							
	Registered Analysis	16·0†	3·0†	6·0*	1·5* 0·75†	3·0* 1·0†	3·5* 1·0†	....
22–4–54	Sample Analysis	16·8	4·5	4·8	1·32	2·52	2·97	....
	Picton Produce Pty., Ltd.							
	"P.P." Dairy Food—							
	Registered Analysis	16·0†	3·0†	10·0*	1·5* 0·5†	0·5* 0·3†	1·5* 0·5†	....
20–8–53	Sample Analysis	12·2	3·6	13·0	1·60	1·13	0·72	....
	"P.P." Laying Mash—							
	Registered Analysis	14·0†	3·0†	7·0*	1·0* 0·5†	0·5* 0·2†	2·0* 0·5†	....
20–8–53	Sample Analysis	18·4	4·2	5·4	0·28	2·34	2·46	....
	"P.P." Pig Food—							
	Registered Analysis	14·0†	2·0†	7·0*	1·0* 0·5†	1·0* 0·2†	2·0* 0·5†	....
20–8–53	Sample Analysis	12·2	3·0	8·5	1·54	1·84	2·90	....
	"P.P." Bone Meal—						Lime (CaO)	
	Registered Analysis	18·75†	....	....	0·25*	26·0†	27·0†	....
20–8–53	Sample Analysis	25·3	....	....	0·095†	25·7	33·9	....
	"P.P." Dairy Food—							
	Registered Analysis	16·0†	3·0†	10·0*	1·5* 0·5†	0·5* 0·3†	1·5* 0·5†	....
21–8–53	Sample Analysis	11·8	3·0	11·9	1·54	1·13	0·41	....
	H. C. Sleigh, Ltd.							
	"Mercury" Feeding Meat and Bone Meal—							
	Registered Analysis	45·0†	14·0*	1·5*	0·6†	17·1†	11·3†	....
30–9–53	Sample Analysis	47·6	12·4	1·0	0·94	12·1	11·3	....
	W. Thomas & Co. (W.A.), Ltd.							
	"Thomas" 18% Protein Chick Starter—							
	Registered Analysis	18·0†	2·5†	6·0*	1·5* 0·5†	3·0* 1·0†	2·5* 1·0†	....
4–6–53	Sample Analysis	18·2	3·4	5·5	0·41	2·43	2·3	....
	"Thomas" 18% Protein Chick Granules—							
	Registered Analysis	18·0†	2·5†	6·0*	0·75* 0·15†	3·0* 1·0†	2·5* 1·0†	....
4–6–53	Sample Analysis	18·8	4·3	5·0	0·32	2·96	2·5	....
	"Thomas" 16% Protein Laying Pellets No. 1—							
	Registered Analysis	16·0†	2·5†	6·0*	2·0* 1·0†	3·5* 0·75†	3·75* 1·0†	....
19–8–53	Sample Analysis	16·6	4·1	6·0	0·22	1·80	3·16	....
	"Thomas" 16% Protein Sweet Dairy Food—							
	Registered Analysis	16·0†	1·5†	8·0*	2·0* 1·0†	1·0* 0·2†	4·0* 1·75†	....
19–8–53	Sample Analysis	16·1	3·6	7·5	1·55	1·52	3·2	....
	"Thomas" 20% Protein Calf Food—							
	Registered Analysis	20·0†	2·5†	8·0*	1·5* 0·5†	2·5* 0·2†	2·5* 0·5†	....
21–8–53	Sample Analysis	27·4	5·1	6·3	0·92	1·88	1·27	....
	"Thomas" 20% Protein Calf Milk—							
	Registered Analysis	20·0†	1·5†	6·0*	1·5* 0·5†	2·5* 0·2†	2·5* 0·5†	....
21–8–53	Sample Analysis	21·4	5·6	3·5	2·87	1·40	1·64	....
	"Thomas" 16% Protein Laying Mash No. 1—							
	Registered Analysis	16·0†	2·5†	6·0*	2·0† 1·0†	3·5* 1·0†	3·75* 1·0†	....
8–9–53	Sample Analysis	17·4	3·7	5·4	0·82	1·99	2·02	....
	"Thomas" 16% Protein Vitamised Laying Mash No. 1—							
	Registered Analysis	16·0†	2·5†	6·0*	2·0 1·0†	3·5* 1·0†	3·75* 1·0†	....
8–9–53	Sample Analysis	17·1	3·6	5·8	0·95	2·15	2·19	....
	"Thomas" 18% Protein Antibiotic Vitamised Chick Granules—							
	Registered Analysis	18·0†	2·5†	6·0*	0·75* 0·15†	3·0* 1·0†	2·5* 1·0†	....
8–9–53	Sample Analysis	18·8	3·7	5·0	0·37	2·35	1·91	....

* Maximum. † Minimum.

Date Sample Taken.	Firm and Brand.	Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride (NaCl)	Phosphoric Acid (P_2O_5).	Calcium (Ca).	Other.
		%	%	%	%	%	%	%
	W. Thomas & Co. (W.A.), Ltd.—continued							
	"Thomas" 15% Protein Chick Grower— Registered Analysis	15·0†	2·5†	6·0*	{ 1·25* 0·5†	{ 3·5* 1·0†	{ 3·75* 0·5†	....
24–9–53	Sample Analysis	15·4	4·3	6·3	0·33	2·32	2·40	....
	"Thomas" 20% Protein Vitamised Laying Pellets— Registered Analysis	20·0†	2·5†	6·0*	{ 2·0* 1·0†	{ 3·75* 1·0†	{ 3·75* 1·0†	....
24–9–53	Sample Analysis	20·9	4·4	6·0	0·36	2·42	2·55	....
	"Thomas" 16% Protein Laying Mash No. 1— Registered Analysis	16·0†	2·5†	6·0*	{ 2·0* 1·0†	{ 3·5* 1·0†	{ 3·75* 1·0†	....
29–10–53	Sample Analysis	17·3	3·9	5·7	1·1	2·18	2·30	....
	"Thomas" 16% Protein Laying Mash No. 1— Registered Analysis	16·0†	2·5†	6·0*	{ 2·0* 1·0†	{ 3·5* 1·0†	{ 3·75* 1·0†	....
12–11–53	Sample Analysis	17·4	3·4	5·4	1·15	2·01	2·00	....
	"Thomas" 16% Protein Laying Mash No. 1— Registered Analysis	16·0†	2·5†	6·0*	{ 2·0* 1·0†	{ 3·5* 1·0†	{ 3·75* 1·0†	....
28–1–54	Sample Analysis	16·8	4·2	5·7	1·6	2·5	2·4	....
	"Thomas" 16% Protein Sweet Dairy Food— Registered Analysis	16·0†	1·5†	10·0*	{ 2·0* 1·0†	{ 1·0* 0·2†	{ 4·0* 1·75†	....
4–2–54	Sample Analysis	18·1	3·3	8·1	1·47	1·06	1·48	....
	"Thomas" 16% Protein Laying Pellets No. 1— Registered Analysis	16·0†	2·5†	6·0*	{ 2·0* 1·0†	{ 3·5* 0·75†	{ 3·75* 1·0†	....
18–2–54	Sample Analysis	16·5	3·4	6·1	0·30	1·83	2·51	....
	"Thomas" 16% Protein Sweet Dairy Food— Registered Analysis	16·0†	1·5†	10·0*	{ 2·0* 1·0†	{ 1·0* 0·2†	{ 4·0* 1·75†	....
7–4–54	Sample Analysis	16·5	2·6	8·3	1·54	1·06	1·53	....
	"Thomas" 18% Protein Antibiotic Vitamised Chick Granules— Registered Analysis	18·0†	2·5†	6·0*	{ 0·75* 0·15†	{ 3·0* 1·0†	{ 2·5* 1·0†	....
7–4–54	Sample Analysis	18·6	4·0	5·6	0·24	2·26	1·50	....
	"Thomas" 16% Protein Vitamised Laying Pellets No. 1— Registered Analysis	16·0†	2·5†	6·0*	{ 2·0* 1·0†	{ 3·5* 0·75†	{ 3·75* 1·0†	....
27–4–54	Sample Analysis	16·0	3·6	6·0	0·26	1·77	2·01	....
	"Thomas" 16% Protein Laying Mash No. 1— Registered Analysis	16·0†	2·5†	6·0*	{ 2·0* 1·0†	{ 3·5* 1·0†	{ 3·75* 1·0†	....
27–4–54	Sample Analysis	16·7	3·6	5·0	0·32	2·09	2·43	....
	"Thomas" Fattening Mash— Registered Analysis	13·0†	2·0†	6·5*	{ 1·5* 0·5†	{ 3·5* 1·0†	{ 3·75* 1·0†	....
27–4–54	Sample Analysis	13·2	3·1	6·6	0·28	1·06	1·84	....
	"Thomas" 20% Protein Laying Pellets— Registered Analysis	20·0†	2·5†	6·0*	{ 2·0* 1·0†	{ 3·75* 1·0†	{ 3·75* 1·0†	....
29–4–54	Sample Analysis	20·5	4·5	5·4	0·40	2·88	3·40	....
	"Thomas" 18% Protein Antibiotic Vitamised Chick Starter— Registered Analysis	18·0†	2·5†	6·0*	{ 1·5* 0·5†	{ 3·0* 1·0†	{ 2·5* 1·0†	....
29–4–54	Sample Analysis	18·9	4·3	5·5	0·33	2·35	1·95	....
	"Thomas" 16% Protein Laying Mash No. 1— Registered Analysis	16·0†	2·5†	6·0†	{ 2·0* 1·0†	{ 3·5* 1·0†	{ 3·75* 1·0†	....
18–5–54	Sample Analysis	16·4	4·3	6·0	0·29	2·33	2·48	....

* Maximum. † Minimum.

ANALYSES OF STOCK FOODS—continued

Date Sample Taken.	Firm and Brand.	Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride (NaCl)	Phosphoric Acid (P_2O_5).	Calcium (Ca).	Other.
		%	%	%	%	%	%	%
								Sulphur (S)
	Tropical Traders & Patersons, Ltd.							
	"Evelyn" Cattle Food—							
	Registered Analysis	5·0†	1·0†	5·5*	13·0* 12·0†	4·25* 3·25†	9·5* 8·5†	3·6*
7–9–53	Sample Analysis	7·03	2·8	4·3	13·0	6·17	8·50	1·03
	"Evelyn" Calf Food—							
	Registered Analysis	8·5†	2·0†	3·86*	3·5* 2·5†	1·25* 0·25†	1·0* 0·2†	1·75*
7–4–54	Sample Analysis	10·2	2·9	2·3	2·50	0·58	0·42	0·64
	The W.A. Meat Export Works.							
	"WAME" Meat Meal—							
	Registered Analysis	45·0†	13·0*	2·0*	....	12·0*	11·0*	....
4–6–53	Sample Analysis	48·7	14·0	1·7	....	10·1	8·9	....
	"WAME" Bone Meal—						Lime (CaO)	
	Registered Analysis	18·75†	....	....	0·25*	26·0†	27·0†	....
24–9–53	Sample Analysis	26·1	....	....	0·19	25·4	33·2	....
	"WAME" Meat Meal—							
	Registered Analysis	45·0†	13·0*	2·0*	....	12·0*	11·0*	....
18–5–54	Sample Analysis	45·2	13·1	1·96	....	9·82	8·64	....
	Westralian Farmers Co-op., Ltd.							
	"Wesfarmers" Sweetened Dairy Meal—							
	Registered Analysis	16·0†	3·0†	10·0*	3·5* 2·0†	3·5* 2·3†	2·5* 2·0†	....
14–8–53	Sample Analysis	16·6	3·3	9·3	2·46	1·62	1·32	....
	"Wesfarmers" Sweetned Dairy Meal—							
	Registered Analysis	16·0†	3·0†	10·0*	3·5* 2·0†	3·5* 2·3†	2·5* 2·0†	....
19–8–53	Sample Analysis	16·4	4·7	7·6	2·87	1·56	2·74	....
	"Wesfarmers" Sweetened Dairy Meal—							
	Registered Analysis	16·0†	3·0†	10·0*	3·5* 2·0†	3·5* 2·3†	2·5* 2·0†	....
21–8–53	Sample Analysis	16·4	3·9	9·7	2·89	1·66	1·54	....
	"Red Comb" Laying Pellets No. 1—							
	Registered Analysis	14·0†	4·0†	7·0*	....	3·5* 2·3*	2·5* 2·0†	....
10–9–53	Sample Analysis	14·9	3·7	6·1	....	1·67	1·34	....
	"Wesfarmers P" Laying Mash No. 1—							
	Registered Analysis	16·0†	4·0†	7·0*	....	3·5* 2·3†	2·5* 2·0†	....
16–9–53	Sample Analysis	15·8	3·9	5·7	....	2·78	2·68	....
	"Red Comb" Growers Pellets—							
	Registered Analysis	14·0†	3·0†	7·0*	....	2·3* 1·2†	1·5* 1·0†	....
24–9–53	Sample Analysis	15·8	5·6	5·7	....	1·63	1·01	....
	"Wesfarmers P" Chick Mash B—							
	Registered Analysis	15·0†	3·0†	7·0*	....	2·3* 1·2†	1·3* 0·8†	....
24–9–53	Sample Analysis	15·2	4·6	6·2	....	2·30	1·21	....
	"Red Comb" All Mash Pellets—							
	Registered Analysis	16·0†	4·0†	7·0*	....	3·5* 2·3†	2·5* 2·0†	....
30–9–53	Sample Analysis	15·3	4·0	5·8	....	1·65	1·42	....
	"Red Comb" Chick Pellets B—							
	Registered Analysis	15·0†	3·0†	7·0*	....	2·3* 1·2†	1·3* 0·8†	....
30–9–53	Sample Analysis	16·0	4·4	5·9	....	1·58	0·72	....
	"Wesfarmers" All Mash—							
	Registered Analysis	16·0†	4·0†	7·0*	....	3·5* 2·3†	2·5* 2·0†	....
8–4–54	Sample Analysis	15·7	4·0	4·2	....	3·37	3·39	....
	"Wesfarmers" Chick Mash B—							
	Registered Analysis	15·0†	3·0†	7·0*	....	2·3* 1·2†	1·3* 0·8†	....
22–4–54	Sample Analysis	14·6	5·0	6·6	....	2·16	1·30	....

* Maximum. † Minimum.

ANALYSES OF STOCK FOODS—continued

Date Sample Taken.	Firm and Brand.	Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride (NaCl)	Phosphoric Acid (P_2O_5).	Calcium (Ca).	Other.
		%	%	%	%	%	%	%
	Westralian Farmers Co-op., Ltd.—continued							
	"Wesfarmers" Chick Mash A—							
	Registered Analysis	16·0†	3·0†	7·0*	....	{ 2·3* 1·2†	{ 1·3* 0·8†	....
22–4–54	Sample Analysis	14·6	4·8	4·5	....	2·12	2·04	....
	"Wesfarmers" Calf Food—							
	Registered Analysis	18·0†	4·0†	7·0*	....	{ 3·5* 2·3†	{ 2·0* 1·5†	....
22–4–54	Sample Analysis	13·0	5·0	4·5	....	2·58	0·50	....
	"Red Comb" Laying Pellets No. 1—							
	Registered Analysis	14·0†	4·0†	7·0*	....	{ 3·5* 2·3†	{ 2·5* 2·0†	....
27–4–54	Sample Analysis	13·6	5·1	6·4	....	2·67	2·80	....
	"Red Comb" Chick Pellets A—							
	Registered Analysis	16·0†	3·0†	7·0*	....	{ 2·3* 1·2†	{ 1·3* 0·8†	....
29–4–54	Sample Analysis	16·0	4·4	6·0	....	2·08	1·32	....
	"Red Comb" All Mash Pellets—							
	Registered Analysis	16·0†	4·0†	7·0*	....	{ 3·5* 2·3†	{ 2·5* 2·0†	....
29–4–54	Sample Analysis	15·0	5·6	5·9	....	3·50	3·29	....
	"Red Comb" Laying Pellets No. 1—							
	Registered Analysis	14·0†	4·0†	7·0*	....	{ 3·5* 2·3†	{ 2·5* 2·0†	....
13–5–54	Sample Analysis	14·6	4·1	5·8	....	3·41	3·23	....
	"Wesfarmers" Sweetened Dairy Meal—							
	Registered Analysis	16·0†	3·0†	10·0*	{ 3·5* 2·0†	{ 3·5* 2·3†	{ 2·5* 2·0†	....
27–5–54	Sample Analysis	16·3	3·3	8·2	1·84	1·80	2·02	....
	Wrights, Ltd.							
	"Wrights" Whale Bone Meal—							
	Registered Analysis	8·5†	....	....	1·0*	30·0†	28·0†	....
12–3–54	Sample Analysis	12·3	....	....	0·34	29·3	35·6	....
	"Wrights" Whale Bone Meal—							
	Registered Analysis	8·5†	....	....	1·0*	30·0†	28·0†	....
18–5–54	Sample Analysis	13·9	....	....	0·37	30·0	38·9	....
	"Ibis" Meat and Bone Meal—							
	Registered Analysis	45·0†	13·5*	3·0*	....	....	....	....
27–5–54	Sample Analysis	48·5	10·8	0·7	....	....	....	....
	R. B. Young.							
	"Morlay" Growing Mash—							
	Registered Analysis	14·0†	3·0†	5·5*	{ 2·0* 0·75†	....	{ 5·0* 2·5†	....
30–9–53	Sample Analysis	17·5	4·2	4·7	0·25	....	2·23	....
	"Morlay" Laying Mash—							
	Registered Analysis	16·0†	3·0†	5·5*	{ 2·0* 0·75†	....	{ 4·0* 2·0†	....
30–9–53	Sample Analysis	18·3	4·1	4·3	0·25	....	3·54	....
	"Morlay" Pig Mash H.P.—							
	Registered Analysis	17·0†	3·0†	6·0*	{ 2·0* 0·75†	....	{ 4·0* 2·0†	....
30–9–53	Sample Analysis	16·8	3·7	3·0	0·22	....	1·94	....
	"Morlay" H.P. Laying Mash—							
	Registered Analysis	20·0†	3·0†	5·5*	{ 2·0* 0·75†	....	{ 4·0* 2·0†	....
19–3–54	Sample Analysis	19·4	3·7	3·7	0·29	....	4·8	....
	"Morlay" Pig Mash H.P.—							
	Registered Analysis	17·0†	3·0†	6·0*	{ 2·0* 0·75†	....	{ 4·0* 2·0†	....
19–3–54	Sample Analysis	14·1	3·4	3·8	0·25	....	1·6	....
	"Morlay" Pig Mash H.P.—							
	Registered Analysis	17·0†	3·0†	2·0*	{ 2·0* 0·75†	....	{ 4·0* 2·0†	....
27–5–54	Sample Analysis	15·3	3·6	3·7	0·40	....	2·34	....
	"Morlay" Growing Mash—							
	Registered Analysis	14·0†	3·0†	5·5*	{ 2·0* 0·75	....	{ 5·0* 2·5†	....
27–5–54	Sample Analysis	15·4	3·6	4·0	0·28	....	3·91	....

* Maximum. † Minimum.

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